

## REPAIRS TO BRIDGES GAURON (7) AND LAFLEUR (7A) LACHINE CANAL

Projet N° CLAC-1524

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SPECIFICATIONS

DIVISION	SECTION	NUMBER OF PAGES
DIVISION 0	SPECIAL REQUIREMENTS	
01010	Archaeological monitoring	2
DIVISION 01	GENERAL REQUIREMENTS	
01 11 00	Work Summary	10
01353-1	General Conditions	3
01353-2	Construction Sequence	5
01353-3	Lanes Closing	4
01353-4	Traffic Maintenance and Temporary Signs	9
01353-5	Variable Message Signs	3
01353-6	Special Signs	3
01353-7	Concrete Guardrails for Construction Sites	2
01353-8	Crash Cushions	3
01 29 00	Payments	70
01 31 19	Project Meetings	3
01 32 16.19	Construction Progress Schedule – BAR (GANTT)	4
01 33 00	Submittal Procedures	7
01 35 29.06	Health and Safety Requirements	6
01 35 43	Environmental Procedures	7
	Appendix A- Mitigation measures table	7
	Appendix B-Example of Environmental protection plan (EPP)	12
01 45 00	Quality Control	4
01 52 00	Construction Facilities	6
01 56 00	Temporary Barriers and Enclosures	5
01 61 00	Common Product Requirements	5
01 73 00	Execution	3
01 74 00	Cleaning	3
01 74 19	Waste Management and Disposal	5
01 77 00	Closeout Procedures	3
01 78 00	Closeout Submittal	5
DIVISION 02	EXISTING CONDITIONS	
02 41 13.13	Paving Removal	5
02 41 16	Structure Demolition	10
02 83 12	Lead Base Paint Abatement – Maximum Precautions	16
DIVISION 03	CONCRETE	
03 10 00	Concrete Forming	5
03 20 00	Concrete Reinforcing	6
03 30 00	Cast-in-place Concrete	12
03 30 03	Concrete Repairs	16

DIVISION 05	METAL	
05 12 33	Structural Steel for Bridges	18
05 50 00	Metal Fabrication	4
DIVISION 07	THERMAL AND MOISTURE PROTECTION	
07 13 52	Modified Bituminous Sheet Waterproofing	10
DIVISION 09	FINISHES	
09 91 13.23	Exterior Painting of Structural Steel	18
DIVISION 26	ELECTRICAL	
26 05 00	Common Work Results for Electrical	6
26 05 05	Selective Demolition for Electrical	3
26 05 20	Wire and Box Connectors (0-1000 V)	3
26 05 21	Wire and Cables (0-1000 V)	2
26 05 28	Grounding - Secondary	3
26 05 29	Hangers and Supports for Electrical Systems	2
26 05 31	Splitter Junctions, Pull Boxes and Cabinets	2
26 05 32	Outlet Boxes, Conduit Boxes and Fitting	2
26 05 34	Conduits, Conduit Fastening and Conduit Fittings	3
26 05 43.01	Installation of Cables in Trenches and in Ducts	3
26 09 23.02	Lighting Control Devices - Photoelectric	2
26 24 16.01	Panelboard Breaker Type	3
26 27 26	Wiring Devices	3
26 28 13.01	Fuses – Low Voltage	2
26 28 16.02	Moulded Case Circuit Breakers	3
26 28 20	Grounding Fault Circuit Interrupters - Class A	3
26 29 01	Contactors	3
26 50 00	Lighting	10
DIVISION 31	EARTHWORK	
31 05 16	Aggregates for Earthwork	3
DIVISION 32	EXTERIOR IMPROVEMENTS	
32 01 11.01	Pavement Cleaning and Marking Removal	2
32 12 16	Bituminous Pavement Covering	15
32 16 00	Curbs, Gutters and Sidewalks	4
32 17 23	Pavement Marking	4
DIVISION 34	TRANSPORTATION	
34 71 13.25	Vehicle W-Beam Guide Rail	12



**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            All drawings issued for tender

**1.2                SUMMARY OF WORKS**

- .1            The Contractor must respect all archaeological monitoring clauses indicated in point 1.3.
- .2            Consider that an archaeologist will be present at the site.

**1.3                ARCHAEOLOGICAL CLAUSES**

- .1            Special Conditions:
  - .1            The Canadian national historic site of the LACHINE CANAL is deemed a highly recognized heritage site by the Canadian government. Thus, all excavation work identified with the potential of containing historical remains or ruins, must be monitored by an Archaeologist appointed by Parks Canada Agency. The excavation work required for the rehabilitation of section of the wall is therefore subject to the following sections' specifications.
  - .2            The Contractor **must provide and continually update the excavation calendar** showing the excavation days and the precision about the anticipate sector and hours of the excavation work and transmit to Government Representative.
  - .3            The Contractor must advise the Government Representative **at least 72 business hours** before the excavation works to ensure the presence of an archaeologist.
- .2            Access and Collaboration:
  - .1            The Contractor must cooperate and comply with all instructions issued by the Government Representative during excavation works to avoid any loss of archaeological information on the site.
  - .2            The Contractor must facilitate access to the work site and collaborate with the Archaeologist. The Archaeologist or his representative will be present on site as required, in relation to the protection and recording of the historical remains. Their role will be to guide the Contractor to avoid loss of archaeological information and to gather information on the remains.
  - .3            The Contractor must allow the team of archaeologists to conduct examinations and archaeological surveys.
- .3            Archaeological Discoveries:
  - .1            The Contractor must notify the Government Representative or, in his absence, the Archaeologist or his representative of any archaeological discovery (remains of buildings or facilities, objects, and fragments of objects) made on the premises and wait for his written instructions before continuing work around the discovery. Relics, antiques, and other items with some interest from a historical, archaeological, or scientific perspective (remains, object, or fragment of an object) found on the site or in the areas of excavation or demolition remain the property

of the Crown. **The Contractor must protect and obtain instructions from the Government Representative in this regard.**

.4 Suspension of Work:

- .1 The Contractor must provide in his contract, at his expense, fifteen (15) minute work suspensions per hour of excavation in all areas requiring the presence of the Archaeologist (as described in section 1.2). These work stoppages, if unused, will be accumulated and can be reused later as needed. A register of the unused time will be documented by the Government Representative in agreement with the Contractor and the Archaeologist.
- .2 For work stoppages lasting more than 30 minutes, the Government Representative will assess the implications of the stoppage and notify the Contractor to that effect. The Contractor may be required to move the machinery to another area to allow the continuation of the archaeologists' work. If reassignment is not possible, the Contractor will be compensated from the bank of hours. In the case where the bank of hours is exhausted, the Contractor will be compensated in accordance with the agreements made during the first site meeting.

.5 Manual Excavations for Archaeological Purposes:

- .1 Given the possibility of archaeological discoveries, the Contractor is advised that during work, manual excavations may be required in addition to any other work necessary in ensuring the protection of discoveries. The Contractor shall be compensated in accordance with the agreements made at the first site meeting.

.6 Protection of Relics and Structures:

- .1 The Contractor must take all reasonable precautions during excavation and other works to protect the excavated remains and to allow their examination by the Archaeologists. **Parks Canada Agency will not tolerate any exception in this regard.** If by neglect the Contractor deteriorates any relic whatsoever, he will be held responsible and the Department will determine the implications.
- .2 In the event where the Government Representative authorizes the demolition of materials on site, the Contractor must take all necessary precautions to ensure the protection of adjacent structures which are not to be demolished. The demolition of materials must be carried out gradually and in a controlled manner once the archaeological surveys have been completed. If items are damaged during construction works, the Contractor must immediately notify the Government Representative.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 DIVISION 00 – *Special Requirements*
- .2 DIVISION 01 – *General Requirements*
- .3 DIVISION 02 – *Existing Conditions*
- .4 DIVISION 03 – *Concrete*
- .5 DIVISION 05 – *Metal*
- .6 DIVISION 07 – *Thermal and Moisture Protection*
- .7 DIVISION 09 – *Painting*
- .8 DIVISION 26 – *Electricity*
- .9 DIVISION 31 – *Earthwork*
- .10 DIVISION 32 – *Exterior Improvements*
- .11 DIVISION 34 – *Transportation*

**1.2 DEFINITION**

- .1 Period of navigation: From the Friday before Victoria Day to Thanksgiving.

**1.3 WORK COVERED BY CONTRACT DOCUMENTS**

- .1 The works covered by this contract include the repair of the superstructures of the Gauron (# 7) and Lafleur (# 7A) bridges that span the Lachine Canal.
- .2 The Contractor must plan and provide all the extraordinary measures required by government recommendations with regard to Covid-19 (Coronavirus), for him and his subcontractors as well as suppliers who must go to the site. The Contractor must include
  - .1 in their prices all extraordinary costs required.
  - .1 General Work includes, but is not limited to:
    - .1 The installation of construction trailers;
    - .2 .2 The facilities required for the storage of materials required for the work;
    - .3 Facilities required for the storage of equipment and tools necessary for the work;
    - .4 Facilities required for the storage of demolition materials, packaging materials and surplus materials for recycling or transportation to a location in compliance with the environmental protection regulations in force on territory of the City of Montreal.
    - .5 The Contractor is responsible for providing adequate working platforms and temporary supports to carry out the work shown on drawings, specifications and Submitting Slip. No additional costs will be granted to the Contractor if he has to modify his access system during the execution

of the work. The workshop drawing of work platform must be sent to and approved by Transport Canada prior to the Contractor's engagement. **The Contractor is responsible for submitting a request for a work notice to Transport Canada for any temporary works (walkways, containment area, etc.) proposed for installation in the Canal, under the bridges and outside the authorized limits by the owner in order to carry out his project. Temporary work must not reduce overhead clearance below the minimum at 2,44m. It is forbidden to install without having first submitted a request for a work order for approval under the Canadian Navigable Waters Act;**

- .6 Provide and set up a containment area for concrete placement or cold weather painting;
- .7 The Contractor is responsible for providing all shelters and heating equipment at his expense to perform the work in cold weather;
- .8 Some stages of the work will be filmed by the Government Representative. By bidding on the contract, the Contractor must become aware of this fact, and can not in any way object to the video shooting during the performance of the work;
- .9 Carry out site repairs;

A navigation corridor must be established along the encroachment zones in the Canal. The Contractor shall provide lateral navigation buoys at each end and one in the middle. The buoys must be completely green to port (left) as you go upstream and fully red to starboard (right) as you go upstream. In addition, safety **buoys** (yellow) to maintain the cable at the surface of the water must be installed between each side buoy every ten (10) meters. **The buoys used must have a height of 30 cm outside the water and a yellow reflective tape 10 cm wide. Wet the buoys on each end of the work and at a maximum interval of fifteen (15) meters.** The installation of buoys and balloons must comply with Transport Canada standards. Wet buoys must comply with the Private Buoy Regulations: <https://laws-lois.justice.gc.ca/PDF/SOR-99-335.pdf>. A navigation corridor plan must be sent and approved to Transport Canada prior to the mobilization of the Contractor.

- .10 **During the navigation period, install yellow warning signs of at least one (1) meter high, marked with yellow reflective material, and installed perpendicular to the waterway, upstream and downstream. downstream of the work areas, at approximately one hundred (100) meters from the beginning and the end of the work to inform users of the waterway of the presence of the work.**



- .11 Request a Notice to Shipping by contacting the Canadian Coast Guard, Notice to Shipping Office at least 72 hours prior to the start of installation and / or removal.**
- .2 The Gauron Bridge Rehabilitation Project (# 7) includes, but is not limited to:
  - .1 The supply, installation, maintenance and dismantling of temporary access required to repair, reinforce, clean and paint all bridge's steel superstructure and counterweight structure;
  - .2 The supply, installation, maintenance and dismantling of containment enclosures required to perform the cleaning and painting of all bridge's steel superstructure and counterweight structure;
  - .3 Reinforcements of the main gussets of the bottom chord of the triangulated trusses include the following:
    - .1 The supply, shaping, cleaning, painting and installation of reinforcement elements to existing main gussets, in accordance with the drawings;
    - .2 The supply, shaping, cleaning, painting and installation of reinforcement elements to the existing main amounts in accordance with the drawings;
    - .3 The supply, shaping, cleaning, painting and installation of reinforcing elements to the existing lower rope, in accordance with the drawings;
  - .4 Reinforcement of the entrance diagonals of the main triangulated trusses (between nodes 0 and 1 and 13 and 16), including the following:
    - .1 Supply, shaping, cleaning, painting and installation of reinforcement elements to existing diagonals;
  - .5 Foundation repairs to North and South abutments, including repair of the south abutment backwall;
  - .6 Partial demolition and reconstruction of the South abutment backwall for deck apron replacement (mobile);
  - .7 Partial demolition and reconstruction of the North abutment backwall for deck (fixed) deck replacement;
  - .8 The demolition and reconstruction of a (fixed) deck joint in the North abutment area;

- .9 Demolition and reconstruction of an (mobile) deck joint in the South abutment area;
- .10 Cleaning of North and South abutments;
- .11 Cleaning and painting of bearings at the South abutment;
- .12 Cleaning and painting the entire steel superstructure of bridge, the structure of the counterweight, the rails and railings including those of the South approach;
- .13 The removal and installation of new galvanized W-Beam guide rail profile on wooden poles at North approach;
- .14 Removal and installation of new g galvanized W-Beam guide rail profile at the South approach;
- .15 Removal and installation of guardrail post anchorages at the Southwest Approach.
- .16 Local pavement surface repair;
- .17 Removal of asphalt by stripping on deck and approaches;
- .18 Local, surface and deep repair of damaged deck slab surfaces of the bridge and South approach tunnel;
- .19 The cleaning of all concrete surfaces of the deck slab of the bridge and tunnel at the South approach;
- .20 The installation of a waterproofing membrane on all concrete surfaces of the deck slab of the bridge and the South approach tunnel;
- .21 The installation of asphalt pavement on bridge's deck and approaches;
- .22 The dismantling of catwalk and guardrails of counterweights;
- .23 Removal and installation of new counterweight plywood panels;
- .24 Repair without extra thickness of certain counterweight surfaces;
- .25 The covering of concrete surfaces of the counterweight with a type 2 surface coating;
- .26 Partial dismantling of catwalk and guardrails of the counterweight;
- .27 The supply and installation of height limitation signs at the North Approach;
- .28 Maintenance of traffic
  - .1 Structural reinforcement works will be completed with the closure of one (1) traffic lane and one (1) lane open to vehicles. It is therefore expected that reinforcement work will be performed on one (1) triangulated truss at a time.
- .29 Refurbishment of the lighting system.
- .3 Reconstruction of Bridge No. 7A (Lafleur) includes, but is not limited to:
  - .1 The supply, installation, maintenance and dismantling of temporary access required to perform the work;
  - .2 Partial demolition and reconstruction of the South abutment backwall for bridge deck replacement, (mobile);
  - .3 The demolition and reconstruction of a (mobile) deck joint at the South abutment;
  - .4 The supply and installation of a new trim for the fixed deck seal at the North abutment;

- .5 The supply and installation of a new trim for the mobile deck joint in the area of the central pier;
- .6 Repair without extra thickness of the concrete walls located between the 2 bridges, North and South side;
- .7 Removal of the asphalt by stripping on the deck of span 1 and South approach;
- .8 Deep repair of damaged deck slab surfaces of span 1 and South approach tunnel;
- .9 Cover the surface of deck 1 and tunnel with concrete screed;
- .10 The installation of asphalt pavement at the South approach;
- .11 The demolition and reconstruction of the curb at the Southeast approach;
- .12 Repair of the guardrail at the Southeast approach;
- .13 The supply and installation of a steel plate for the repair of a stiffener of a main beam;
- .14 Cleaning the North and South abutments and the central pier;
- .15 Repair without extra thickness of certain counterweight surfaces;
- .16 Covering concrete surfaces of the counterweight with type 2 surface coating;
- .17 Repairing a stiffener.
- .18 Maintenance of traffic
  - .1 Temporary signage for bridge closure during bridge rehabilitation.
- .19 Refurbishment of the lighting system

#### 1.4 CONTRACT METHOD

- .1 The work must be the subject of a single contract of repair at fixed price and at a unit price, according to the articles presented in the Submitting Slip.

#### 1.5 WORK BY OTHERS

- .1 Not used.

#### 1.6 FUTURE WORK

- .1 Not used.

#### 1.7 WORK SEQUENCE

- .1 Delay
  - .1 The work on the Gauron (7) and Lafleur (7A) bridges must be fully completed within thirty-five (35) calendar weeks (including the two weeks of the construction holidays) from April 5, 2021.
  - .2 It is forbidden to close the Gauron (7) and Lafleur (7A) bridges at the same time, for any type of closure
- .2 Ordering
  - .1 Site Facilities
    - .1 At the **start-up meeting**, submit to the Government Representative the **Site Facilities Development Plan** for approval.



- .1 Within five (5) business days of submission of the Site Facilities Development Plan, the Government Representative will provide the Contractor with a revised copy of the Plan, with comments, if applicable.
  - .2 Within five (5) working days following the acceptance of the site installation plan, the Contractor must have completed the installation of construction trailers.
  - .3 No work may begin without the approval of the Site Facilities Plan.
- .2 Rehabilitation of Gauron Bridge (7) and Lafleur Bridge (7)
- .1 Schedule work in accordance with drawings and specifications. The reinforcement work will proceed as follows:
    - .1 Plan installation of new steel parts for the repair or reinforcement of frames or assemblies during complete night closures.
    - .2 Plan for the removal of rivets and the installation of temporary bolts
    - .3 Plan three (3) phases for the painting of the Gauron Bridge steel structure:
      - .1 One for the P1 truss
      - .2 One for the P2 truss
      - .3 One for the part under the deck slab after the closure of the Lachine Canal to navigation.
  - .2 At the **start-up meeting**, submit to the Government Representative, the **Order of Execution** of the Gauron Bridge Rehabilitation Project (7), justifying each phase of work.
    - .1 The Work Order must be prepared by prioritizing certain work to allow the execution of other work, by favoring the execution time.
    - .2 Within five (5) working days of delivery of the Work Order, the Government Representative will provide the Contractor with a copy of the Work Order and comments, if applicable.
    - .3 No work can begin without the approval of the Order of Execution.
  - .3 At the **start-up meeting**, submit to the Government Representative the **Comprehensive Plan (GANTT Bar Chart)** considering the data compiled in the Work Order.
    - .1 Prepare the Master Plan in accordance with the deadline specified in this section of the specifications and the Submitting Slip.
    - .2 Within five (5) business days of submission of the Master Plan, the Government Representative will provide the

- Contractor with a revised copy of the Master Plan, with comments, if applicable.
- .3 Submit the Implementation Schedule to the Government Representative no later than five (5) working days after acceptance of the Master Plan.
  - .4 Within five (5) working days of delivery of the Implementation Schedule, the Government Representative will provide the Contractor with a revised copy of the Schedule with comments, if applicable.
  - .5 No work can begin without the approval of the Implementation Schedule.
- .4 Perform all repairs to Gauron Bridge (7) in accordance with the Work Order and Schedule of Execution approved by the Government Representative.
  - .5 At the **start-up meeting**, submit to the Government Representative the **Temporary Traffic Control Boards** for the execution of the work.
    - .1 Within five (5) working days following the issuance of Temporary Road Traffic Control Boards, the Government Representative will provide the Contractor with a revised copy of the report together with comments, if applicable.
    - .2 Within five (5) working days following the acceptance of Temporary Road Signs, the Contractor must have completed the installation of these on the site.
  - .6 At the **start-up meeting**, submit to the Government Representative the **Shop Drawings of the temporary access system** required for the work.
    - .1 Within five (5) business days of submission of Access System Shop Drawings, the Government Representative will provide the Contractor with a revised copy of the drawings, with comments, if applicable.
    - .2 Immediately upon approval of Temporary Access System Drawings, Approval of the Environmental Protection Plan (EPP) and Temporary Signage is in place and approved by the Government Representative, implement the temporary access system on the site.
  - .7 Five (5) working days after the start-up meeting, submit to the Government Representative the **Environmental Protection Plan (EPP)** for the work.
    - .1 Within five (5) business days of submission of the EPP Shop Drawings, the Government Representative will provide the Contractor with a revised copy of the drawings, along with any comments, if any.

- .2 Immediately upon receipt of EPP approval by the Government Representative, mobilization of the Work will be permitted.
- .8 Unless otherwise indicated in the specifications, submit the shop drawings required for the work to the Government Representative within ten (10) working days of the start of the work.
  - .1 Within five (5) working days of submission of shop drawings, the Government Representative will provide the Contractor with a copy of the drawings, with comments, if applicable.
  - .2 Within 5 working days of approval of shop drawings, deliver materials to site.

## **1.8 WORK EXECUTION ORDER**

- .1 Plan and provide all extraordinary measures required by government recommendations for Covid-19 (Coronavirus). The Contractor must include in their prices all extraordinary costs required.
- .2 In accepting this contract, assume all responsibilities normally assigned to the supervisor, under the law on health and safety at work. Before starting work, carry out the following activities:
  - .1 Submit to the Government Representative a work safety plan and a mechanical inspection certificate for each piece of machinery used on site.
  - .2 Ensure workers on site have the necessary training and information to perform the work safely and that all required tools and protective equipment are available, in compliance with standards, laws and regulations.
  - .3 Always comply with the provisions of the Act respecting occupational health and safety and the Safety Code for the construction industry.
  - .4 Advise your workers that they have the right to refuse any work that poses a danger to their health or safety.
  - .5 Delimit and barricade your work area and control access.
  - .6 In the event of an unforeseen incident, take all necessary measures, including work stoppage, to protect the health and safety of workers and the public, and communicate promptly with the Government Representative.

## **1.9 CONTRACTOR USE OF PREMISES**

- .1 The work area may be used on a continuous basis until substantial completion of the work (completion date), except during the navigation period under the bridge section in the navigation channel and in the respecting the zones assigned to the Contractor as described in the plans.
- .2 Site access can not be used as a storage area and site area for construction trailers.
- .3 The use of the site is restricted to the areas required for the execution of the work and those made available to the Contractor for the installation of his site facilities as well as for the storage of his equipment and material required for the work. The Contractor must allow access to these exclusive zones to the Owner to allow:

- .1 Equipment maintenance;
- .2 The occupation of the premises by the Owner, if required;
- .3 Execution of work by other Contractors.
- .4 Co-ordinate use of premises under direction of Government Representative
- .5 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- .6 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .7 Refer to Section 01 52 00 - *Construction Facilities* and Section 01 56 00 - *Temporary Barriers and Enclosures* for temporary facilities, service roads and parking Areas, traffic control and public services.
- .8 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Government Representative.
- .9 Under no circumstances may the Contractor use existing works for his work. He must take the necessary precautions to protect them and he assumes full responsibility for any claim resulting from the damage attributable to him. An authorization from the Government Representative is required before any installation (fixing, etc.) on an existing structure. At completion of operations condition of existing work: equal to or better than that which existed before new work started.

#### **1.10 OWNER OCCUPANCY**

- .1 The Owner will occupy the premises surrounding the Gauron Bridge (7) and the places surrounding the Lafleur Bridge (7A) throughout the construction period and will continue its normal activities during this period.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

#### **1.11 PARTIAL OWNER OCCUPANCY**

- .1 Establish a schedule for the substantial completion of work in the designated areas, to allow occupation by the Owner before the substantial completion of all the work under contract.
- .2 Parks Canada will occupy designated areas for storage of supplies and equipment.
- .3 Execute the obligations for the issuance of the Certificate of Substantial Completion for each Designated Area before the Owner occupies the premises. The Contractor must allow access to the premises of the Owner's personnel at all time.
- .4 When occupying the premises, the Owner will ensure, for these areas:
  - .1 maintenance;
  - .2 security.
- .5 Execute the obligations related to the issuance of the Interim Certificate of Completion for each Designated Area, prior to the Owner partially occupying the premises. Then, allow access to the premises of the Owner's staff.

**1.12 PRE-PURCHASED EQUIPMENT**

- .1 Not used.

**1.13 OWNER FURNISHED ITEMS**

- .1 Not used.

**1.14 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1 Not used.

**1.15 EXISTING SERVICES**

- .1 Before interrupting utility services, notify the Government Representative at least ten (10) working days in advance. Take the necessary agreements and authorizations from the utility's companies concerned and obtain the necessary authorizations and pay the costs for the permits.
- .2 Prior to commencement of work, define the extent and location of utility lines in the work area and inform the Government Representative.

**1.16 DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each document as follows:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Reviewed Shop Drawings.
  - .5 List of Outstanding Shop Drawings.
  - .6 Change Orders.
  - .7 Other Modifications to Contract.
  - .8 Field Test Reports.
  - .9 Copy of Approved Work Schedule.
  - .10 Health and Safety Plan and Other Safety Related Documents.
  - .11 Other documents as specified.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.



**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 11 00 – *Summary of Work*
- .2        Section 01353-2 – *Construction Sequence*
- .3        Section 01353-3 – *Lane Closings*
- .4        Section 01353-4 – *Traffic Maintenance and Temporary Signs*
- .5        Section 01353-5 – *Variable Message Signs*
- .6        Section 01353-6 – *Special Signs*
- .7        Section 01353-7 – *Concrete Guardrails for Construction Sites*
- .8        Section 01353-9 – *Crash Cushions*

**1.2                REFERENCES**

- .1        Quebec Highway Safety Code, latest version;
- .2        Safety Code for the Construction Industry, latest version;
- .3        Tome V – Road signs, volumes 1 and 2, from the Quebec Ministry of Transport (MTQ), highway construction standards series (Normes – Ouvrages routiers), latest version – hereafter referred to as Tome V;
- .4        Tome I – Highway design, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome I;
- .5        Tome II – Highway construction, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome II;
- .6        Tome III – Civil engineering structures, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome III;
- .7        Tome VII – Materials, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VII;
- .8        Tome VIII – Crash Cushions, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VIII;
- .9        Highway construction site safety action plans (*Plans d’action en matière de sécurité sur les sites de travaux routiers*), 2007 season and latest version.

- .10 The Contractor is advised that the table titled *Échéances à respecter pour la mise aux normes des dispositifs de signalisation (deadlines for standards compliance of traffic-control devices) in Tome V, volumes 1 and 2*, is not valid for this contract. The Contractor must therefore adhere to the signalling standards in effect at the date on which bidding opens, within the timeframe specified in the above-mentioned table.

### 1.3 EXTENT OF TEMPORARY SIGNAGE WORK

- .1 The work includes, without being limited to, the supply and installation of temporary traffic signals required for maintaining traffic flows and protecting workers during repair work on bridges 7 (Gauron) and 7A (Lafleur), which span the Lachine Canal, in the City of Montreal, and for all related work specified in the totality of the contract documents.
- .2 Work covered by the present document includes, without being limited to:
- .1 Preparation of all traffic signage plans;
  - .2 Supply, installation, maintenance, relocation, replacement, commissioning or decommissioning and removal of temporary traffic signs and signals, all of which is to be done in compliance with the requirements stated in the present document;
  - .3 Maintenance of signage and of traffic lanes;
  - .4 Identification of vertical or ground-based signs or signals to be removed, covered or relocated, and their storage for the duration of work and reinstallation at the end of work;
  - .5 Supply, installation, maintenance, operation, programming, relocation, replacement, commissioning, decommissioning and removal of variable message signs (VMS);
  - .6 Production, installation, maintenance, relocation, replacement, commissioning or decommissioning and removal of special panels;
  - .7 Supply, installation, maintenance, relocation and replacement of concrete guardrails for construction sites;
  - .8 Supply, commissioning, maintenance, relocation and replacement of crash cushions.
  - .9 Supply of five (5) flagman to manage the intersection of St-Patrick / Dollard avenue during the use of opposite freeway lane on the Lafleur and Gauron bridges;
  - .10 Erasure and marking of pavement, when required;
  - .11 Temporary signage and all equipment and labour required for the complete performance of the work described above;
  - .12 And other work required for the complete execution of the project in an environment safe for drivers, pedestrians, workers and neighbours, and related work required for completion of the work covered by the present contract.
- .3 Parks Canada may request that additional temporary traffic signage work be done in order to ensure the safety of workers and road users or to improve traffic flow.



#### 1.4 LOCATION

- .1 The temporary traffic signage work is located on and near Dollard Avenue in the city of Montreal. The borders of the work zone include, without being limited to:
  - .1 South: St-Patrick Street
  - .2 North: Notre-Dame Street
  - .3 East: Angrignon Boulevard
  - .4 West: Clément Street
- .2 However, the Contractor may be required to work in a larger territory for the installation of peripheral sign panels or for all of the other work described in the tender documents.

#### 1.5 QUANTITIES

- .1 For the present contract, the quantities for traffic maintenance are based on the time frame specified in the contract. Quantities effectively achieved within this time frame will be paid at the unit prices stated in section 5 of the Bid Form.
- .2 Beyond the time frame specified, the Contractor must maintain, at his own expense, signage and traffic management until the end of the work in question, despite any schedule overrun. No additional fees related to signage and maintenance of traffic flows will be paid by Parks Canada for the Contractor's overruns of the specified short time frame.
- .3 Any claim based on approximate variations in the quantities shown in section 5 of the Bid Form will be refused.

#### 1.6 CLAIMS AND COMPLAINTS

- .1 Any claim or complaint from a road user must be received with courtesy. The Contractor must advise the Supervisor of such complaints and keep the Supervisor apprised of follow-up action.
- .2 The Contractor and the Supervisor are to collate all relevant information so that Parks Canada can perform its own analysis and follow-up, if necessary.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 11 00 – *Summary of Work*
- .2        Section 01353-1 – *General Conditions*
- .3        Section 01353-3 – *Lane Closings*
- .4        Section 01353-4 – *Traffic Maintenance and Temporary Signage*
- .5        Section 01353-5 – *Variable Message Signs*
- .6        Section 01353-6 – *Special Signs*
- .7        Section 01353-7 – *Concrete Guardrails for Construction Sites*
- .8        Section 01353-8 – *Crash Cushions*

**1.2                REFERENCES**

- .1        Quebec Highway Safety Code, latest version;
- .2        Safety Code for the Construction Industry, latest version;
- .3        Tome V – Road signs, volumes 1 and 2, from the Quebec Ministry of Transport (MTQ), Highway Construction Standards Series (Normes – Ouvrages routiers), latest version – hereafter referred to as Tome V;
- .4        Tome I – Highway design, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome I;
- .5        Tome II – Highway construction, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome II;
- .6        Tome III – Civil engineering structures, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome III;
- .7        Tome VII – Materials, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VII;
- .8        Tome VIII – Crash Cushions, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VIII;
- .9        Highway construction site safety action plans (*Plans d'action en matière de sécurité sur les sites de travaux routiers*), 2007 season and latest version.

- .10 The Contractor is advised that the table titled *Échéances à respecter pour la mise aux normes des dispositifs de signalisation (deadlines for standards compliance of traffic-control devices) in Tome V, volumes 1 and 2*, is not valid for this contract. The Contractor must therefore adhere to the signalling standards in effect at the date on which bidding opens, within the timeframe specified in the above-mentioned table.

### 1.3 WORK SECTIONS

- .1 The repair work on bridges 7 (Gauron) and 7A (Lafleur) is separated into two phases:
- .1 The first phase is the repair work of of bridge 7 (Gauron).
  - .2 The second phase is the repair work of bridge 7A (Lafleur).
- .2 The repair work on bridges 7 (Gauron) and 7A (Lafleur) cannot be done simultaneously.
- .3 The Contractor must execute the work of each phase within the allotted durations specified in section 01 11 00 – Summary of Work.

### 1.4 CONSTRUCTION SEQUENCE: PHASE 1

#### .1 Phase 1: Work on the west side of Bridge 7 (Gauron)

- .1 This work phase consists of the repair work of the Bridge 7 (Gauron). Refers to plans GC-02-220.
- .2 The bridge must be partially closed so closing one lane out of two and maintaining one lane open at 3.8 meters for maximal duration of twenty-eight (28) weeks.
- .3 To repair the bridge on the east side of the bridge 7 (Gauron) for a maximal duration of 14 weeks :
  - .1 The work shall be carried out using long-term closures (one out of two lanes) in accordance with the appropriate GC-02-220 plans and according to the requirements of section 01353-3 – Lane closures.
  - .2 The Contractor must at all times maintain a lane of 3.8 meters on the open side to traffic on the St-Pierre avenue at the south direction . The work area must be separated from the circulation using concrete barriers.
  - .3 The sidewalk located on the west side of St-Pierre avenue must be kept open on all times during this phase.
- .4 To repair the bridge on the west side of the bridge 7 (Gauron) for a maximal duration of 14 weeks :
  - .1 The work shall be carried out using long-term closures (one out of two lanes) in accordance with the appropriate GC-02-220 plans and according to the requirements of section 01353-3 – Lane closures.
  - .2 The Contractor must at all times maintain a lane of 3.8 meters on the open side to traffic on the St-Pierre avenue at the south direction using concrete barriers.

- .3 The sidewalk located on the west side of St-Pierre avenue must be closed and the Contractor must install a pedestrian detour via the bridge 7A (Lafleur) during this phase.
- .5 The bridge must be completely closed at night and closed during five (5) weekends during work.
- .6 During weekends closure of the bridge, the Contractor shall install signage in accordance with the GC-02-220 plans to completely close the Bridge 7 (Gauron) and divert one lane of traffic on the opposite bridge (7A) Lafleur.
- .7 During the complete closure of the bridge and during the use of the opposite lane of the bridge 7A (Lafleur), detours must be established to maintain a north-south connection.
- .8 During long weekends closures, traffic will be diverted in the opposite direction on the bridge 7A (Lafleur), a minimum of 3.6 meters per direction.
- .9 The Contractor must prohibit trucking on the bridge 7A (Lafleur) during the use of the opposite lane on the bridge. The Contractor must mobilize a detour path during this phase.
- .10 The Contractor shall install signage signs in accordance with the plans GC-02-220. The Contractor must keep a single lane in the north direction towards the bridge 7A (Lafleur) when the bridge 7 (Gauron) is completely closed.
- .11 The Contractor shall prohibit turning trucks towards the bridge 7A (Lafleur) and buses traveling on St-Patrick street eastbound and westbound. Trucks and buses will be diverted along the detours shown on the GC-02-220 plans.
- .12 The bicycle path located below the bridge 7A (Lafleur) must be kept open during this phase.
- .13 The pedestrian passage on the west side of the bridge 7 (Gauron) must be closed when the bridge 7 (Gauron) is completely closed. The detour path is shown in GC-02-220.
- .14 The Contractor must at all times ensure the safe passage of pedestrians and cyclists. If necessary, the Contractor must provide flagmen as often as required to ensure the safe passage of pedestrians and cyclists, as described in Section 01353-4 Traffic Control and Temporary Signage.
- .15 The installation and removal of temporary signage must comply with the requirements of Section 01353-3. The Contractor must always maintain at least one lane of 3.5 meter width in each direction on Dollard Avenue North and South during repair work.

## 1.5 CONSTRUCTION SEQUENCE: PHASE 2

### .1 Phase 2: Work on the Bridge 7A (Lafleur)

- .1 This work phase consists of the repair work of the Bridge 7A (Lafleur). Refers to plans GC-02-221.

- .2 The bridge must be partially closed so closing one lane out of two and maintaining one lane open at 3.5 meters for a maximal duration of five (5) weeks.
- .3 To repair the bridge on the west side of the bridge 7A (Lafleur) for 2 weeks:
  - .1 The work shall be carried out using long-term closures (one out of two lanes) in accordance with the appropriate Gc-020-221 plans and according to the requirements of section 01353-3 – Lane closures.
  - .2 The Contractor must at all times maintain a lane of 3.5 meters on the open side to traffic on the Dollard avenue at the north direction using concrete barriers.
  - .3 The sidewalk located on the east side of Dollard avenue must be kept open on all times during this phase.
  - .4 The Contractor must put in place truck detours according to the GC-02-220 plans.
- .4 To repair the bridge on the east side of the bridge 7A (Lafleur) maximal duration of 3 weeks :
  - .1 The work shall be carried out using long-term closures (one out of two lanes) in accordance with the appropriate GC-02-221 plans and according to the requirements of section 01353-3 – Lane closures.
  - .2 The Contractor must at all times maintain a lane of 3.5 meters on the open side to traffic on the Dollard avenue at the north direction using concrete barriers.
  - .3 The sidewalk located on the east side of Dollard avenue must be kept open and secure to maintain a 2.0 meters width at all time during the work.
  - .4 The Contractor must put in place truck detours according to the GC-02-221 plans.
- .5 The carry out the work, The Contractor must completely closed the Lafleur bridge at night and closed during three (3) weekends during work.
- .6 During weekends closure of the bridge, the Contractor shall install signage in accordance with the GC-02-221 plans to completely close the Bridge 7A (Lafleur) and divert one lane of traffic on the opposite bridge (7) Gauron.
- .7 During the complete closure of the bridge and during the use of the opposite lane of the bridge 7 (Gauron), detours must be established to maintain a north-south connection.
- .8 During long weekends closures, traffic will be divert in the opposite direction on the bridge 7 (Gauron) , a minimum of 3.5 meters must be maintain per direction.
- .9 The Contractor must prohibit trucking on the bridge 7 (Gauron) during the use of the opposite lane on the bridge. The Contractor must mobilize a detour path during this phase.
- .10 The bicycle path located below the bridge 7 (Gauron) must be kept open during this phase.
- .11 The Contractor must at all times ensure the safe passage of pedestrians and cyclists. If necessary, the Contractor must provide flagman as often as requires to ensure the safe passage of pedestrian and cyclists, as described in Section 01353-4 Traffic Control and Temporary Signage.

- .12 The installation and removal of temporary signage must comply with the requirements of Section 01353-3. The Contractor must always maintain at least one lane of 3.5 meter width in each direction on Dollard Avenue North and South during repair work.

## 1.6 CONSTRUCTION SEQUENCE: PHASE 3

### .1 Work on Bridge 7A (Lafleur)

- .1 This work phase comprises repair work on Bridge 7A (Lafleur).
- .2 The bridge must be completely closed during this work phase. The Contractor must install concrete guardrails for construction sites at the north and south ends of the bridge to restrict access and protect the work site.
- .3 The Contractor must install concrete guardrails for construction sites with guardrail-mounted barriers as outlined in Section 01353-8, along the entire width of the south end of the bridge along the railway tracks. Barriers must be at least 3.05 m (10 feet) from the tracks and perpendicular to Dollard Avenue South, to delimit the grade crossing.
- .4 During this phase traffic will be redirected in the opposite direction on Bridge 7 (Gauron), with a 3.5 m lane heading north and a 3.5m lane heading south.
- .5 The Contractor must install traffic signs as required by DN-V-4-TLUDU 027, latest version. The center lane as well as the left and right turning lanes on Dollard Avenue North at the St. Patrick intersection must remain open, while the right lane must be closed with the use of visual aids at the intersection. The center lane will be reserved for movement towards the detour lanes on Bridge 7 (Gauron), and the left lane will be reserved for left turns only. To allow movement from the center lane to the lane in the opposite direction on Bridge 7 (Gauron), the contractor must move the stop line at the intersection back by 12m in the left turning lane.
- .6 The Contractor must prohibit turns onto Bridge 7 (Gauron) for trucks driving east and west on St. Patrick and for buses heading west. Trucks and buses will be redirected to Dollard Avenue South with a U-turn linking to Dollard Avenue North, and will then continue their route towards the detour lane heading north on Bridge 7 (Gauron). The Contractor must install special signs marking the detour.
- .7 The Contractor is responsible for removing road markings and adding temporary markings to indicate lanes and detours during this work phase. Once the work is completed the Contractor must remove temporary markings and replace the original ones.
- .8 The pedestrian and bicycle path on the east side of the bridge as well as the bicycle path under Bridges 7 and 7A must remain open during this work phase.
- .9 The Contractor must ensure the safe passage of pedestrians and cyclists at all times, and must provide as much signage as needed to ensure their safe passage, as outlined in Section 01353-4 – Traffic Maintenance and Temporary Signage.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1            Section 01 11 00 – *Summary of Work*
- .2            Section 01353-1 – *General Conditions*
- .3            Section 01353-2 – *Construction Sequence*
- .4            Section 01353-4– *Traffic Maintenance and Temporary Signage*
- .5            Section 01353-5– *Variable Message Signs*
- .6            Section 01353-6 – *Special Signs*
- .7            Section 01353-7 – *Concrete Guardrails for Construction Sites*
- .8            Section 01353-8 – *Crash Cushions*

**1.2                REFERENCES**

- .1            Quebec Highway Safety Code, latest version;
- .2            Safety Code for the Construction Industry, latest version;
- .3            Tome V – Road signs, volumes 1 and 2, from the Quebec Ministry of Transport (MTQ), Highway Construction Standards Series (Normes – Ouvrages routiers), latest version – hereafter referred to as Tome V;
- .4            Tome I – Highway design, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome I;
- .5            Tome II – Highway construction, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome II;
- .6            Tome III – Civil engineering structures, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome III;
- .7            Tome VII – Materials, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VII;
- .8            Tome VIII – Crash Cushions, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VIII;
- .9            Highway construction site safety action plans (*Plans d’action en matière de sécurité sur les sites de travaux routiers*), 2007 season and latest version.

- .10 “Traffic Management for Roadwork” section, standard specification issued by the City of Montreal, latest version;
- .11 The Contractor is advised that the table titled *Échéances à respecter pour la mise aux normes des dispositifs de signalisation (deadlines for standards compliance of traffic-control devices) in Tome V, volumes 1 and 2*, is not valid for this contract. The Contractor must therefore adhere to the signalling standards in effect at the date on which bidding opens, within the timeframe specified in the above-mentioned table.

### **1.3 MEASUREMENT FOR PAYMENT PURPOSES**

- .1 Costs arising from compliance with requests for lane closings are included in general costs that are covered under various items of section 5 of the Bid Form.

### **1.4 REQUEST FOR TRAFFIC LANE CLOSING AND DELAYS**

- .1 In order to carry out work requiring the closing of traffic lanes within the City of Montreal, the Contractor must obtain a temporary permit to occupy public land from the borough in question for work on public lands under municipal jurisdiction. The forms to be completed for each borough are posted on the City of Montreal website at [ville.montreal.qc.ca](http://ville.montreal.qc.ca).
- .2 The Contractor must include with the permit application any signage and detour plans approved by the Supervisor, for each of the barriers the Contractor is planning to erect.
- .3 This information must be delivered to the boroughs and to the Supervisor not less than five (5) business days before a closing.
- .4 The Contractor must also provide the Supervisor with a copy of the municipal permits obtained from City of Montreal boroughs, prior to a closing.

### **1.5 CANCELLATION OF A PLANNED CLOSING DUE TO FORCE MAJEURE**

- .1 Parks Canada reserves the right to cancel a lane closing on the Contractor’s schedule due to major events. Such reasons may relate to the weather, public safety, or any other reason deemed valid by Parks Canada.
- .2 In return, the deadline is extended by one day for every day of cancellation if the Contractor demonstrates that the cancellation impedes critical progress and could push back the completion date of the work.
- .3 In the case of such a cancellation of lane closing by Parks Canada, related costs are to be included in the various articles of section 5 of the Bid Form.

### **1.6 TRAFFIC OBSTRUCTIONS**

- .1 The Contractor must take the necessary measures to ensure that equipment, materials, facilities, on-site vehicle movements and the work itself do not obstruct traffic or hinder the operation of public utilities.



- .2 A traffic obstruction is considered to be:
  - .1 Any action or lack of action by the Contractor that impedes the free movement of vehicles without authorization or permit;
  - .2 Any obstacle or vehicle that prevents the free movement of vehicles without authorization or permit;
  - .3 Any closing of traffic lanes without work being performed;
  - .4 Any premature lane closing or delayed lane reopening, in relation to the authorized schedule.

## 1.7 AUTHORIZED CLOSINGS – SCHEDULES AND RESTRICTIONS

- .1 Generally, the repair work on bridges 7 and 7A (Gauron and Lafleur) will be done with a minimum of closings in order to minimize the effects of the work on traffic.
- .2 The Contractor must carefully plan the work in order to minimize lane closings.
- .3 The Supervisor's approval is required before proceeding with any lane closing.
- .4 All the Contractor's operations that require a complete closure of the Bridge 7 (Gauron) short duration must be conducted between 11:00 p.m. and 6:00 a.m from Monday to Friday, between 11h59 p.m.and 6h00 a.m. from Saturday to Sunday, and between 21h00p.m.and 5h00 a.m from Sunday to monday.. These operations include installation of the temporary signage and its complete dismantling. These hours could be changed by the Supervisor, as needed.
- .5 All the Contractor's operations that require a complete closure of the Bridge 7 (Gauron) during five (5) week-ends must be conducted from 11:00 p.m. to 6:00 a.m from Friday to Monday. These operations include installation of the temporary signage and its complete dismantling. These hours could be changed by the Supervisor, as needed.
- .6 Moreover, for the purposes of this contract, the Contractor is authorized to proceed with the long-term closing of one lane on Bridge 7 (Gauron) for a maximum period of fourteen (14) weeks for the east side and fourteen (14) weeks for the west side
- .7 All the Contractor's operations that require the closure of one lane of the Bridge 7A (Lafleur) of short duration must be conducted between 9:00 p.m. and 5:00 a.m from Monday to Friday, between 10h00 p.m.and 8h00 a.m. from Saturday to Sunday, and between 22h00p.m.and 5h00 a.m from Sunday to Monday.. These operations include installation of the temporary signage and its complete dismantling. These hours could be changed by the Supervisor, as needed.
- .8 All the Contractor's operations that require a complete closure of the Bridge 7A (Lafleur) short duration must be conducted between 10:00 p.m. and 5:00 a.m from Monday to Friday, between 11h59 p.m.and 8h00 a.m. from Saturday to Sunday, and between 22h00p.m.and 5h00 a.m from Sunday to Monday.. These operations include installation of the temporary signage and its complete dismantling. These hours could be changed by the Supervisor, as needed.

- .9 All the Contractor's operations that require a complete closure of the Bridge 7A (Lafleur) during three (3) week-ends must be conducted from 10:00 p.m. to 6:00 a.m from Friday to Monday. These operations include installation of the temporary signage and its complete dismantling. These hours could be changed by the Supervisor, as needed.
- .10 Moreover, for the purposes of this contract, the Contractor is authorized to proceed with the long-term closing of one lane on Bridge 7A (Lafleur) for a maximum period of three (3) weeks for the east side and two (2) weeks for the west side
- .11 All the road closures mentioned above are conditional on obtaining the permits of occupancy from the City.
- .12 The Contractor must set the traffic lights at the intersection of Dollard avenue and St-Patrick Street in a flashing mode when the traffic ins managed by flagman.

## **1.8 OTHER RESTRICTIONS RELATED TO LANE CLOSINGS**

- .1 Starting October 15, Parks Canada may decline to authorize lane closings during precipitation (freezing rain, snow, blowing snow, etc.) requiring road snow removal or de-icing operations. In such cases, days on which the Contractor is prevented from closing lanes may be added to the work schedule if the Contractor demonstrates that the cancellation impedes critical progress.
- .2 Furthermore, starting October 15, all temporary signage material required for short-term lane closings but not in use must be cleared upon opening of the lanes.
- .3 On statutory holidays, Parks Canada reserves the right to decline to authorize closings or to modify the allowed times for closings.
- .4 The Contractor must take such holidays into account in planning his schedule. In such cases, days on which the Contractor is denied permission to close lanes may not be added to the work schedule, and any claim based on such denied request for a closing will be rejected.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1            Section 01 11 00 – *Summary of Work*
- .2            Section 01353-1 – *General Conditions*
- .3            Section 01353-2 – *Construction Sequence*
- .4            Section 01353-3 – *Lane Closings*
- .5            Section 01353-5 – *Variable Message Signs*
- .6            Section 01353-6 – *Special Signs*
- .7            Section 01353-7 – *Concrete Guardrails for Construction Sites*
- .8            Section 01353-8 – *Crash Cushions*

**1.2                REFERENCES**

- .1            Quebec Highway Safety Code, latest version;
- .2            Safety Code for the Construction Industry, latest version;
- .3            Tome V – Road signs, volumes 1 and 2, from the Quebec Ministry of Transport (MTQ), Highway Construction Standards Series (Normes – Ouvrages routiers), latest version – hereafter referred to as Tome V;
- .4            Tome I – Highway design, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome I;
- .5            Tome II – Highway construction, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome II;
- .6            Tome III – Civil engineering structures, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome III;
- .7            Tome VII – Materials, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VII;
- .8            Tome VIII – Crash Cushions, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VIII;
- .9            Highway construction site safety action plans (*Plans d'action en matière de sécurité sur les sites de travaux routiers*), 2007 season and latest version.

- .10 The Contractor is advised that the table titled *Échéances à respecter pour la mise aux normes des dispositifs de signalisation (deadlines for standards compliance of traffic-control devices) in Tome V, volumes 1 and 2*, is not valid for this contract. The Contractor must therefore adhere to the signalling standards in effect at the date on which bidding opens, within the timeframe specified in the above-mentioned table.

### 1.3 MEASUREMENT FOR PAYMENT PURPOSES

- .1 Refer to items 5.1, 5.2 et 5.3 of section 01 29 00 – Payment Procedures.

### 1.4 CONTRACTOR'S RESPONSIBILITIES

- .1 The purpose of traffic maintenance is to ensure the safety of motorists and workers and to maintain the free flow of traffic.
- .2 The Contractor is responsible for ensuring the free flow of traffic in accordance with the requirements of sections 01353-1 to 01353-9, for the full duration of the work.
- .3 Work will take place according to a schedule that accounts for the requirements of traffic flow. The Contractor must be capable of intervening **at any time of day, seven (7) days a week**.
- .4 The Contractor must take the necessary measures with his crews and subcontractors to ensure that equipment, materials, facilities, construction vehicles and the work itself do not hinder traffic or the operations of public utilities.

### 1.5 TEMPORARY SIGNAGE PLANS

- .1 The Contractor must supply temporary signage plans. These plans must include traffic maintenance plans representing each phase of the work and plans for the lane closings required for completion of the work. The plans must also include detour routes, designs for the production of detour signs and special signs, plans required for management of pedestrians and cyclists, and plans for temporary road markings. The plans must accurately reflect actual conditions on the site (horizontal and vertical curves) and indicate the location of site access points.
- .2 Plans must be produced in electronic file format pdf. The deadline for submitting plans to the Site Supervisor for each phase (maintenance plans), lane-closing and detour route plans, and road marking plans is ten (10) days before installation of the signs for each phase of the work.
- .3 Submission of plans within the prescribed time frame and their approval by the Supervisor is required for permission to begin work. The Supervisor reserves the right to make any change to these plans deemed necessary.
- .4 Detour and Pedestrian and Cyclist Management Plans must correspond to the requirements of section 01353-2 – Construction Sequence and to the GC-02-220 plans.

## 1.6 SIGNAGE MANAGER AND SITE MANAGER

- .1 The signage manager and site manager are considered as personnel assigned to signage for the work. By virtue of that fact, they must have successfully completed training set out in section 10.3.3.1 “Signage Manager and Site Manager” of the CCDG.
- .2 The signage manager must be present on the site during all relocations of signage equipment and during the changeover from one phase to another. The signage manager may be replaced by another member of their staff at certain times during the work, but must advise and obtain the approval of the Supervisor for such replacement. Replacement personnel must be capable of receiving requests from the Supervisor and making appropriate decisions. A list of potential replacement personnel must be submitted for approval at the start-up meeting.
- .3 The signage manager must contact the Supervisor before the beginning of any signage work in order to obtain approval to proceed, and must provide real-time notice of any changes or developments. In addition, the Supervisor must be able to reach the signage manager at all times. To that end, the Contractor is required to supply the signage manager with a mobile telephone that is operational at all times, including messaging system.
- .4 The signage manager must be an employee of the Contractor, and the choice of employee must be approved by the Supervisor. The signage manager is required to participate actively in the planning of closings and in all site meetings as well as daily planning meetings.
- .5 The appointment of the signage manager and the site manager and their approval by the Supervisor are prerequisites for authorization to start work.
- .6 The main tasks of the signage manager include but are not limited to the following:
  - .1 Attend site and planning meetings;
  - .2 Produce and transmit lane closing requests within the timeframes stipulated herein;
  - .3 Check and transmit signage and marking plans, detour routes, optional routes and shop drawings of special panels prepared by the signage subcontractor, within the timeframes stipulated herein;
  - .4 Be present on site during all lane closings and openings and during all relocations of signage or crash cushions;
  - .5 Provide the Supervisor with real-time notice of work (lane openings and closings);
  - .6 Within the timeframes stipulated herein, transmit certifications of the installation of crash cushions and signage panels signed by an engineer member of OIQ and the drainage well inspection certificate;
  - .7 Provide the Supervisor with the AQTR training completion cards for workers and subcontractors present on site;
  - .8 Provide the Supervisor with all other certifications stipulated herein;

- .9 Communicate with the Contractor concerning traffic maintenance and temporary signage;
- .10 Ensure that signage is maintained;
- .11 Prepare draft messages to be posted on variable message signs and transmit them to the Supervisor for approval 24 hours prior to their set-up, relocation or change in message.

## **1.7 SPECIAL REQUIREMENTS FOR TRAFFIC MAINTENANCE AND TEMPORARY SIGNAGE**

- .1 Regardless of the duration of a closing, the choice of signboard and size of panels must meet the criteria for long-term work.
- .2 The values listed below replace the values for length and spacing specified in the standardized drawings in *Tome V*, volume 1.
  - .1 Maximum spacing of visual indicators (except lane merge sign); “E” value of ten (10) metres.
- .3 When certain signage elements are no longer relevant, the Contractor must remove or render them non-functional without delay, as follows:
  - .1 Inoperative visual indicators must be removed from open lanes, as far as possible onto the shoulder, and placed behind a guardrail, when possible;
  - .2 T-B-2 barriers must be placed away from shoulders and behind a guardrail, or be removed and collected at openings;
  - .3 Work signage or special signs that are not in use must be removed and collected, or obscured, as per one of the options in figure 4.44-1 of *Tome V*, volume 1. Only one option is to be applied for the site as a whole, and the Contractor must specify which one is chosen at the beginning of work.

## **1.8 PERSONNEL AND EQUIPMENT ASSIGNED TO SIGNAGE**

- .1 **Personnel assigned to signage, signalling crew and flagmen**
  - .1 At the kickoff meeting, the Contractor must provide the Supervisor with the list of all persons assigned to signage and comprising the Contractor’s signage crews. The Contractor must also supply a copy of the certificates attesting to successful completion of the required training. The personnel list and certificates are prerequisites for authorization to begin work.
- .2 **Service vehicles**
  - .1 Every service vehicle and escort truck must:
    - .1 Be a pickup truck;
    - .2 Have a total weight under load of not less than two thousand seven hundred (2,700) kilograms;
    - .3 Be equipped such as to be in compliance with the Highway Safety Code;
    - .4 Be equipped with a signalling arrow light and a rotating warning light;

- .5 Have a type IV reflective yellow strip with a minimum width of seventy-five (75) millimetres (standard 14101, *Tome VII*) on the back and sides of the vehicle.

## 1.9 SIGNAGE FOR PEDESTRIAN AND CYCLIST ZONES

- .1 For the duration of the work, the Contractor must ensure that routes used by pedestrians and cyclists are safe. To achieve this, the Contractor is to set up signage indicating the path reserved for these users. The Contractor must keep the bike paths on the east side of Bridge 7A and under Bridges 7 and 7A open and safe at all times. If work could partially obstruct pedestrian and cyclist routes temporarily, the Contractor must provide two flagmen to ensure safe passage as often as required. Such work must be done outside peak times, meaning between 23:59 and 05:00.

## Part 2 Products

### 2.1 SIGNAGE MATERIALS

#### .1 Visual indicators

- .1 Accepted visual indicators are T-RV-1 (on bypasses only), T-RV-2, T-RV-7, T-RV-8, T-RV-9, T-RV-11 and T-R-V-12.
- .2 Visual indicators must be compliant with the requirements of *Tome V*, volume 1 as to their shape and colour, and the reflection coefficient of their reflective film must not be less than fifty percent (50%). They must be in good condition, properly positioned (in use or not), supplied in sufficient quantity and clean.

#### .2 T-B-2 barriers

- .1 In addition to the requirements of *Tome V*, volume 1, every shoulder, ramp (on- or off-) or lane that is closed to traffic must have one or several T-B-2 barriers.
- .2 T-B-2 barriers must be compliant with the requirements of *Tome V*, volume 1, in good condition, properly positioned (in use or not), supplied in sufficient quantity, and clean.

#### .3 Construction zone signs

- .1 Construction zone signs are those specified in the plates of *Tome V*, volume 1, modified to suit the conditions on the site for the present contract, and those included in appendix B of chapter 4 of *Tome V*, volume 1.
- .2 The minimum dimension of the signs must correspond to the speed posted on the white-background P-70 sign, and the one for long-term work.
- .3 Construction zone sign panels must be made according to the Quebec Ministry of Transportation (MTQ) production specifications available on the MTQ's website at [www.mtq.gouv.qc.ca](http://www.mtq.gouv.qc.ca).
- .4 In addition to the requirements of *Tome V*, volume 1, all construction zone signs, including special signs and detour signs, must meet the following requirements:

- .1 All signs deployed for more than three (3) consecutive days must be installed in a permanent manner (sunk into the ground or attached to a rigid concrete guardrail) and be located at the outer edges of the shoulder;
- .2 When ballasted signs are placed on the shoulder, they must be placed as far as possible from traffic lanes;
- .3 When signs are placed on the edges of sidewalks, they must be completely clear of the sidewalk and also be installed at a height of 2.2 metres from the ground;
- .4 When signs are located behind a flexible or semi-rigid guardrail, they must be installed at least one metre behind the guardrail.
- .5 In addition to the requirements of *Tome III*, all posts sunk into the ground and whose lateral clearance from the sign (construction site signs or special signs) is less than that indicated in the grid on page 3 of chapter 2 of *Tome VIII*, must correspond to those on the certification list of the HOM 6310-101 program, “Support cédant sous impact – Petite signalisation” (Breakaway Posts for Small Signs).
- .6 Before installing posts, the Contractor must perform all required checks to ensure that no public utility infrastructure or underground structures will be damaged in the process.
- .7 Signs must be compliant with the requirements of *Tome V*, and those of article 1.7 of this section, as to their shape and colour, and the reflectivity coefficient of their reflective film must not be less than fifty percent (50%). They must be in good condition, properly positioned (in use or not), supplied in sufficient quantity and clean.

### **Part 3 Execution**

#### **3.1 ACCESS TO WORK AREAS**

##### **.1 Access to work areas**

- .1 Entrance and exit operations must be safe and performed in a manner that ensures the full protection of workers and road users.
- .2 Therefore, the Contractor and subcontractors must arrange for the use of flagmen to provide access to any vehicle entering or exiting a work area adjacent to an open traffic lane. The Contractor must also provide this service to the Supervisor’s crews.
- .3 The cost of flagmen is also included in the article “Traffic Maintenance and Temporary Signs” of section 5 of the Bid Form.
- .4 Procedures for access to work areas must be submitted to the Supervisor before the beginning of work.
- .5 All vehicles entering the work area via a site access point must be equipped with a rotating warning light.
- .6 When not in use, all access points must be kept closed using T-RV-7 visual indicators placed not more than two (2) metres apart. When construction is



active, access points may be kept open in order to facilitate the entrance and exit of authorized vehicles. However, the Contractor must under no circumstances do work around site access points. In such cases, the Contractor must close the access point using movable rigid guardrails.

**.2 Storage of materials and heavy machinery**

- .1 At all times, even outside working hours (evenings, weekends and statutory holidays), the Contractor must park machinery and store equipment and material in a manner that ensures the safety of road users, in accordance with the clearance distance for traffic lanes shown in the chart on page 3 or chapter 2 (Highway approaches) of Tome VIII, or one meter behind guardrails.

**3.2 MAINTENANCE OF SIGNALLING DEVICES AND TRAFFIC LANES**

**.1 Maintenance of signalling devices**

- .1 When the signalling devices are in position, whether in operation or not, the Contractor must provide the labour, equipment and supplies necessary for regular cleaning of the devices (visual indicators, arrow signals, T-B-2 barriers and construction zone signs) in order to ensure their continuing reflectivity.
- .2 A maintenance crew must also conduct a complete inspection tour of the site weekly and make all necessary adjustments to the temporary signage. These inspections must be done between 9:00 a.m. and 3:00 p.m. Before beginning each inspection, the maintenance crew must inform the Supervisor of their presence. In addition, a report for each inspection must be submitted to the Supervisor at the conclusion of each inspection. A copy of the inspection report form to be completed by the inspection crew must be submitted to the Contractor at the kickoff meeting.

**.2 Maintenance of traffic lanes**

- .1 The Contractor is responsible for maintaining traffic lanes used by motorists during the construction, within the boundaries of the site. More specifically, the Contractor is responsible for:
  - .1 Patching any hole twenty five (25) millimetres deep or deeper in traffic lanes and on shoulders, as soon as the Contractor takes charge of the site and throughout the duration of the work;
  - .2 Cleaning asphalt surfaces where traffic is maintained, and for keeping them clear of all debris or liquid or solid material, whether such material (sand, earth, gravel, etc.) originates from the construction work or not, and whether brought to the site by traffic, the Contractor or the weather;
  - .3 Cleaning, removing snow and de-icing the fasteners of the concrete guardrails in order to allow water to flow and drain from the pavement;
  - .4 Taking all necessary steps to prevent the accumulation of such materials on the pavement and acting immediately to remove them, should they start to accumulate;

- .5 Maintaining the work area and traffic lanes such that no dust is rendered airborne;
- .6 Ensuring the proper drainage of the pavement;
- .7 Performing any other work required for the proper maintenance of traffic.

### **.3 Emergency intervention**

- .1 The Contractor must intervene on-site following a request from Parks Canada or from the Supervisor, when a situation affecting the safety of road users arises (e.g. temporary signage moved into the traffic lanes), **at any time of day, seven (7) days a week**. This may also apply to the maintenance of traffic lanes outside construction hours, for example the patching of a hole in the pavement.

### **3.3 EXISTING SIGNAGE**

- .1 By taking possession of the site, the Contractor assumes responsibility for existing road signage on the site.
- .2 The Contractor must, for the full duration of the contract, maintain, cover, remove, store, move or adjust all signage in and bordering the site whose message is no longer appropriate. At the end of work, all permanent signs existing before the start of the contract that were removed, stored, moved, covered or modified are to be reinstalled in compliance with the requirements of Tome V, volume 1, or restored to their previous condition.
- .3 The Contractor must plan for the replacement of existing damaged posts before the beginning of work, with new posts including new hardware.
- .4 In order to meet all these conditions, the Contractor must, in cooperation with the Supervisor and before the beginning of the work, conduct a detailed inventory of signage to be removed, covered or moved.
- .5 For each such sign, the inventory must include at a minimum one photo of the sign and a sketch of its location (position, clearance and height). A copy of this inventory must be submitted to the Supervisor as a prerequisite for authorization to begin work.
- .6 The Contractor must also prepare an inventory of existing road markings that are to be erased so that the roadway can be remarked correctly once work is completed. A copy of the inventory must be submitted to the Supervisor before work is authorized to begin.
- .7 The Contractor provide the City of Montreal with a minimum of forty-eight (48) hours' notice before taking down signs belonging to the municipalities.

### 3.4 COORDINATION

- .1 The contractor must ensure the homogeneity of the signage with neighboring sites and coordinate its signage with other sites as often as necessary
- .2 The contractor's signage manager must attend the coordination meetings and carry out the necessary coordination during complete closure of the bridge. The contractor must anticipate that these neighboring sites will require significant coordination with his own site and that delays of closures will be possible.
- .3 .3 All other costs related to these activities are allocated to the various items on the submitting slip.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 11 00 – *Summary of Work*
- .2        Section 01353-1 – *General Conditions*
- .3        Section 01353-4 – *Traffic Maintenance and Temporary Signs.*

**1.2                REFERENCES**

- .1        Quebec Highway Safety Code, latest version;
- .2        Safety Code for the Construction Industry, latest version;
- .3        Tome V – Road signs, volumes 1 and 2, from the Quebec Ministry of Transport (MTQ), Highway Construction Standards Series (Normes – Ouvrages routiers), latest version – hereafter referred to as Tome V;
- .4        Tome I – Highway design, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome I;
- .5        Tome II – Highway construction, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome II;
- .6        Tome III – Civil engineering structures, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome III;
- .7        Tome VII – Materials, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VII;
- .8        Tome VIII – Crash Cushions, from the Quebec Ministry of Transport highway construction standards series, – hereafter referred to as Tome VIII;
- .9        Highway construction site safety action plans (*Plans d'action en matière de sécurité sur les sites de travaux routiers*), 2007 season and latest version.
- .10      The Contractor is advised that the table titled ***Échéances à respecter pour la mise aux normes des dispositifs de signalisation (deadlines for standards compliance of traffic-control devices) in Tome V, volumes 1 and 2***, is not valid for this contract. The Contractor must therefore adhere to the signalling standards in effect at the date on which bidding opens, within the timeframe specified in the above-mentioned table.

**1.3                MEASUREMENT FOR PAYMENT PURPOSES**

- .1        Refer to item 5.9 of section 01 29 00 – Payment Procedures.

## **Part 2 Products**

### **2.1 EQUIPMENT AND MATERIALS**

- .1 In addition to the requirements of article 8.16 of *Tome V*, volume 2, variable message signs supplied by the Contractor must meet the following requirements:
  - .1 Be easily movable;
  - .2 Allow the display of three (3) lines of twelve (12) characters with a minimum height of three hundred (300) millimetres;
  - .3 Have a “radar” option;
  - .4 Be equipped with a remote control system allowing the remote modification of messages using the same software for all VMS supplied under the present contract;
  - .5 Use a communication protocol compatible with NTCIP;
  - .6 The control software must allow the creation of messages on a minimum of two (2) screens; allow a succession of messages over a minimum span of seven (7) days; allow the preview of messages via cellular telephone; allow the manual and automatic adjustment of the sign’s brightness. The software must run on Windows XP.
  - .7 The brightness of the diodes must automatically adapt to ambient conditions via photoelectric cell. At least three (3) thresholds must allow four (4) different brightness states;
  - .8 Be solar powered.

## **Part 3 Execution**

### **3.1 INSTALLATION AND MAINTENANCE**

- .1 Upon request of the Supervisor and following the Supervisor’s orders, the Contractor must supply, install, program messages or relocate variable message signs.
- .2 Variable message signs must be functional throughout the entire duration of their use. In addition, the Contractor must take the necessary steps to ensure that the voltage at the battery terminals is no less than twelve (12) volts. The City of Montreal reserves the right to verify this parameter either by telemetry or directly.
- .3 One week prior to work on Bridge 7 (Gauron), one variable message sign (VMS) shall be installed before the bridge, on the north approach, at a location to be specified by the Supervisor. One variable message sign (VMS) shall be installed before the bridge, on the south approach, at a location to be specified by the Supervisor. The messages to be displayed will be provided by the Supervisor prior to installation.
- .4 One week prior to work on Bridge 7A (Lafleur), one VMS shall be installed before the bridge, on the south approach, at a location to be specified by the Supervisor. One variable message sign (VMS) shall be installed before the bridge, on the north approach,

at a location to be specified by the Supervisor. The messages to be displayed will be provided by the Supervisor prior to installation.

- .5
- .6 One week prior to work on Bridge 7 (Gauron), one variable message sign (VMS) shall be installed before the bridge, on the north approach, at a location to be specified by the Supervisor. Also, one week prior to the closure of Bridge 7A (Lafleur), two VMSs shall be installed at locations to be specified by the Supervisor. The VMSs announcing the closure of Bridge 7A (Lafleur) shall remain in place for four (4) weeks. The messages to be displayed will be provided by the Supervisor prior to installation.
- .7 Variables messages signs must remain in operation for the duration of the work.
- .8 The Contractor shall inform the Supervisor in real-time of the proper installation of the variable message sign(s). The following information must be provided at the time of installation:
  - .1 The signs' owner;
  - .2 The signs' identification;
  - .3 Their type (30 x 56 or 30 x 72);
  - .4 Their precise position (with reference to a chaining);
  - .5 The telephone number, including area code.
- .9 At each relocation, modification, change or removal of variable message sign(s), the Contractor must provide the same information to the Supervisor.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1            Section 01 11 00 – *Summary of Work*
- .2            Section 01353-1 – *General Conditions*
- .3            Section 01353-4 – *Traffic Maintenance and Temporary Signs*

**1.2                REFERENCES**

- .1            Quebec Highway Safety Code, latest version;
- .2            Safety Code for the Construction Industry, latest version;
- .3            Tome V – Road signs, volumes 1 and 2, from the Quebec Ministry of Transport (MTQ), Highway Construction Standards Series (Normes – Ouvrages routiers), latest version – hereafter referred to as Tome V;
- .4            Tome I – Highway design, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome I;
- .5            Tome II – Highway construction, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome II;
- .6            Tome III – Civil engineering structures, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome III;
- .7            Tome VII – Materials, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VII;
- .8            Tome VIII – Crash Cushions, from the Quebec Ministry of Transport highway construction standards series, – hereafter referred to as Tome VIII;
- .9            Highway construction site safety action plans (*Plans d’action en matière de sécurité sur les sites de travaux routiers*), 2007 season and latest version.
- .10          The Contractor is advised that the table titled ***Échéances à respecter pour la mise aux normes des dispositifs de signalisation (deadlines for standards compliance of traffic-control devices) in Tome V, volumes 1 and 2***, is not valid for this contract. The Contractor must therefore adhere to the signalling standards in effect at the date on which bidding opens, within the timeframe specified in the above-mentioned table.

**1.3                MEASUREMENT FOR PAYMENT PURPOSES**

- .1            Refer to item 5.7 of section 01 29 00 – Payment Procedures.

**Part 2 Products**

**2.1 EQUIPMENT AND MATERIALS**

- .1 Special signs are made on plywood (¾") or aluminum.
- .2 Each sign must be a single piece, as shown on the right-hand illustration in figure 4.20-2 of Tome V – Road signs, volume 1, from the Quebec Ministry of Transport (MTQ), highway construction standards series, latest version, or as per specifications provided by the Supervisor.
- .3 Signs are covered with orange-coloured reflective film of type IV.
- .4 Lettering is black and, when required, the highway-number crest of the road in question is made of type IV film.
- .5 At the Supervisor's request, signs may be required to be made of coroplast if they are to be installed over existing signs.
- .6 Special signs are used for complementing the rest of the construction signage, and may also be used to post prohibitions or warnings as requested by the Supervisor. They must meet the Supervisor's requirements as well as the requirements stated in article 2.1.4 of section 01353-4 – Traffic maintenance and temporary signs.
- .7 Series T-90 signs, except T-90-4, T-90-5 and series T-95 signs, are not considered special signs, since they are covered by Appendix B "Dispositifs de signalisation pour les travaux" [signs for construction sites] to chapter 4 "Travaux" [work] of Tome V, and are considered construction site signs.

**Part 3 Execution**

**3.1 INSTALLATION AND MAINTENANCE**

- .1 Special signs may be installed on concrete guardrails or in-ground posts, as per the Supervisor's request.
- .2 One week prior to the start of work, the Contractor shall build and install two (2) type T-210 signs indicating the duration of the work in accordance with Ministry specifications. The signs shall be built using plywood (¾" thick) or aluminum. The location for the signs will be specified by the Site Supervisor. The type T-210 signs indicating the duration of the work are considered special signs.
- .3 For each type of installation, the Contractor must provide a plan signed and sealed by a member of the Ordre des ingénieurs du Québec, showing details of the sign, required hardware and location.



- .4 Upon request of the Supervisor, the Contractor has forty-eight (48) hours to produce and install special signs in the designated locations. The same amount of time is given to the Contractor for the total or partial replacement of a sign in case of defect or vandalism.
- .5 For maintenance, the Contractor has four (4) hours to reinstall a crooked or fallen sign and one hour to clean the sign and ensure its visibility.
- .6 Special signs are provided on a for-hire basis and remain the property of the Contractor. All special signs must be available for the full duration of the contract.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 01 11 00 – *Summary of Work*
- .2 Section 01353-1 – *General Conditions*
- .3 Section 01353-2 – *Construction Sequence*
- .4 Section 01353-4 – *Traffic Maintenance and Temporary Signage*

**1.2 REFERENCES**

- .1 Quebec Highway Safety Code, latest version;
- .2 Safety Code for the Construction Industry, latest version;
- .3 Tome V – Road signs, volumes 1 and 2, from the Quebec Ministry of Transport (MTQ), Highway Construction Standards Series (Normes – Ouvrages routiers), latest version – hereafter referred to as Tome V;
- .4 Tome I – Highway design, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome I;
- .5 Tome II – Highway construction, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome II;
- .6 Tome III – Civil engineering structures, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome III;
- .7 Tome VII – Materials, from the Quebec Ministry of Transportation highway construction standards series, latest version – hereafter referred to as Tome VII;
- .8 Tome VIII – Crash Cushions, from the Quebec Ministry of Transport highway construction standards series, – hereafter referred to as Tome VIII;
- .9 Highway construction site safety action plans (*Plans d'action en matière de sécurité sur les sites de travaux routiers*), 2007 season and latest version.
- .10 The Contractor is advised that the table titled ***Échéances à respecter pour la mise aux normes des dispositifs de signalisation (deadlines for standards compliance of traffic-control devices) in Tome V, volumes 1 and 2***, is not valid for this contract. The Contractor must therefore adhere to the signalling standards in effect at the date on which bidding opens, within the timeframe specified in the above-mentioned table.

**1.3 MEASUREMENT FOR PAYMENT PURPOSES**

**.1 Rental of concrete guardrails for construction sites**

.1 Refer to item 5.6 of section 01 29 00 – Payment Procedures.

**.2 Displacement of concrete guardrails for construction sites**

.1 Refer to item 5.6 of section 01 29 00 – Payment Procedures.

**.3 Maintenance of concrete guardrails for construction sites**

.1 Refer to item 5.6 of section 01 29 00 – Payment Procedures.

**Part 2 Products**

**2.1 MATERIALS**

.1 In addition to the requirements of *Tome VIII*, all guardrails must be in new condition. Guardrails damaged during handling or otherwise imperfect and deemed by the Supervisor to be unusable must be repaired or replaced by the Contractor. Acceptance criteria include, but are not limited to, the following:

- .1 Absence of cracks extending to both sides of the end of the guardrail;
- .2 Presence of connectors free of any loosening at the ends;
- .3 Placement such that the curb at the end of the guardrail does not create an obstacle with enough room for a tire to be inserted.

**Part 3 Execution**

**3.1 DESCRIPTION**

- .1 For purposes of delimiting work areas and protecting workers, the Contractor must supply on a for-hire basis concrete guardrails for construction with “I” connectors.
- .2 The use of concrete guardrails is required for all work requiring the presence of workers on a site adjacent to a traffic lane (municipal artery), for all work within the site.
- .3 If necessary and at the Supervisor’s request, the Contractor must undertake to replace, repair or reposition the guardrails.
- .4 Concrete guardrails for construction sites are also required for management of pedestrians and cyclists at the approaches to the site, as described in Section 01353-2 – Construction Sequence.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 11 00 – *Summary of Work*
- .2        Section 01353-1 – *General Conditions*
- .3        Section 01353-2 – *Construction Sequence*
- .4        Section 01353-4 – *Traffic Maintenance and Temporary Signs*
- .5        Section 01353-7 – *Concrete Guardrails for Construction Sites*

**1.2                REFERENCES**

- .1        Quebec Highway Safety Code, latest version;
- .2        Safety Code for the construction industry, latest version;
- .3        Tome V – Road signs, volumes 1 and 2, from the Quebec Ministry of Transport (MTQ), Highway Construction Standards Series (Normes – Ouvrages routiers), latest version – hereafter referred to as Tome V;
- .4        Tome I – Highway design, from the Quebec Ministry of Transport highway construction standards series, latest version – hereafter referred to as Tome I;
- .5        Tome II – Highway construction, from the Quebec Ministry of Transport highway construction standards series, latest version – hereafter referred to as Tome II;
- .6        Tome III – Civil engineering structures, from the Quebec Ministry of Transport highway construction standards series, latest version – hereafter referred to as Tome III;
- .7        Tome VII – Materials, from the Quebec Ministry of Transport highway construction standards series, latest version – hereafter referred to as Tome VII;
- .8        Tome VIII – Crash Cushions, from the Quebec Ministry of Transport highway construction standards series, – hereafter referred to as Tome VIII;
- .9        Highway construction site safety action plans (Plans d’action en matière de sécurité sur les sites de travaux routiers), 2007 season and latest version.
- .10      The Contractor is advised that the table titled ***Échéances à respecter pour la mise aux normes des dispositifs de signalisation (deadlines for standards compliance of traffic-control devices) in Tome V, volumes 1 and 2***, is not valid for this contract. The Contractor must therefore adhere to the signalling standards in effect at the date on which bidding opens, within the timeframe specified in the above-mentioned table.

**1.3 MEASUREMENT FOR PAYMENT PURPOSES**

**.1 Crash cushion for construction sites, type TL-2 for-hire**

.1 Refer to item 5.4 of section 01 29 00 – Payment Procedures.

**.2 Displacement of a type TL-2 crash cushion**

.1 Refer to item 5.4 of section 01 29 00 – Payment Procedures.

**.3 Maintain of a type TL-2 crash cushion**

.1 Refer to item 5.4 of section 01 29 00 – Payment Procedures.

**.4 Replacement of a type TL-2 crash cushion**

.1 Refer to item 5.5 of section 01 29 00 – Payment Procedures.

.2

**1.4 CERTIFICATION OF COMPLIANCE**

.1 Upon installation or relocation of a crash cushion, the certification of compliance must indicate the following:

- .1 The installation complies with applicable standards and follows the manufacturer's requirements.
- .2 Approval of the installation by an engineer who is a member of the Ordre des ingénieurs du Québec.
- .3 The certification must be completed at the time of installation of the device.
- .4 The certification must be forwarded by the Engineer to the Supervisor or Supervisor's representative before traffic lanes are opened.

.2 Upon repair or replacement of the crash cushion, the certification must indicate the following:

- .1 The installation complies with applicable standards and follows the manufacturer's requirements.
- .2 Approval of the installation by an engineer who is a member of the Ordre des ingénieurs du Québec.
- .3 The certification must be completed at the time of installation of the device.
- .4 The certification must be forwarded by the Engineer to the supervisor or supervisor's representative before traffic lanes are reopened.

**Part 2 Products**

**2.1 MATERIALS AND SUPPLIES**

**.1 Crash cushion**

- .1 Performance level: TL-2 (Test NCHRP 350). the choice of performance level of the crash cushion is based on the speed shown on the P-70 white-background sign.

### **Part 3 Execution**

#### **3.1 INSTALLATION**

- .1 Install crash cushions in compliance with the manufacturer's requirements and the applicable standards, at each end of a line of concrete guardrails (for construction sites or permanent) that represents an obstacle to traffic.
- .2 The crash cushion must cover the end of the line of guardrails, without blocking the traffic lane or the adjacent shoulder. An orange and white chevron or hazard marker, made of type V film for orange and type IV film for white, must be affixed to the front of the crash cushion.

#### **3.2 WINTER MAINTENANCE**

- .1 When outdoor temperatures are likely to go below 0°C, the contractor must, at its own expense, take the necessary steps to ensure that the liquid within the crash cushion does not freeze. The liquid used must be non-toxic and have a specific gravity roughly equivalent to that of water.

#### **3.3 REPAIR OR REPLACEMENT**

- .1 Following an impact on one of its crash cushions, the Contractor has eight (8) hours to repair it, or replace it with a fully functional unit.
- .2 Furthermore, if the damaged crash cushion partially or completely obstructs one or more traffic lanes, the Contractor has thirty (30) minutes, starting from oral notice from the supervisor, to clear the lane(s).

**END OF SECTION**

## Explanation of the prices quoted on the Bid Form

### DESCRIPTION OF ITEMS IN UNIT PRICE TABLE

*Note 1:* The units of the payment methods are indicated in the unit price of the submission slip. They include but are not limited to: the supply of materials and labor, as well as their transportation and installation, the specific measures depending on the nature of the work, codes and professional standards required. The quantities indicated must be approved in advance by the Engineer and the PCA Representative.

*Note 2:* The Contractor must add in each item of the tender form to plan and provide all the extraordinary measures required according to government recommendations for Covid-19 (Coronavirus), and this, for him and his subcontractors as well as his suppliers who must go to the site. The Contractor must include in their prices all extraordinary costs required.

#### Part 1            **Item 1. - I - Site Office, Environment and General Items**

##### 1.1                **Item 1.1 – Construction Facilities**

- .1            The price at payment item 1.1 of the Bid Form is a lump sum overall price to offset all costs incurred for the facilities required to perform the Work as well as costs that are not part of other payment items. Bid Form, in accordance with the prescriptions of drawings and specifications.
- .2            The price includes everything described in Section 01 52 00 - *Site Facilities* and the following, but not limited to:
  - .1            Electrical energy, water, site lighting and snow clearing of construction areas and accesses;
  - .2            Site offices, furniture, telephone and related services (internet, fax machines, photocopiers, color scanners, etc.), microwave oven, small refrigerator (9 cubic feet minimum), cold and hot water dispenser, including the supply of drinking water, heating and air conditioning of construction offices;
  - .3            Access roads, platforms, walkways, scaffolding and other access equipment which are not specifically included in items 1.4.1, 1.4.2, 1.4.3 and 1.4.4;
  - .4            Access roads, platforms, walkways, scaffolding and other access equipment, construction signs, moving, storage and repositioning of street furniture (tables, benches, garbage cans, etc.); sanitary installations, rigid construction site fences (minimum height of 2440 mm and all the displacements required according to the scheduling of works, working methods, detours, deviations, etc.) and surround the total mobilization zone during the whole duration of the works, in accordance with the requirements of the specifications and as directed by the Government Representative. In addition, all requirements related to the protection of cycle or multi-use trails during work in areas where the trails are open to the public,

- including temporary construction site fencing at the locations indicated on the drawings and signers (at all times ) for all crossing and entrances;
- .5 Participation of the person in charge of traffic maintenance in meetings every 2 weeks of Mobilité Montréal
- .6 Maintaining traffic and temporary signage, including but not limited to:
- .1 The mobilization of access to work areas, their maintenance and dismantling;
  - .2 Construction panels and their maintenance;
  - .3 Maintenance of access to properties;
  - .4 Provide signalman for site access and crossings of cycle or multipurpose track opened during the works;
  - .5 Maintenance of signs and circulation lanes including requested inspections;
  - .6 Modification of existing signage and site restoration at the end of the work;
  - .7 Bilingualism of temporary signs;
  - .8 Other costs related to special requirements for traffic maintenance and **encroachment in the navigation corridor.**
- .7 Maintenance of the site and its access.
- .8 The required coordination with the City of Montreal and other interferant, including the obtaining of all permits required for carrying out the work.
- .9 The required coordination and management of traffic management by police services
- .10 All that is required in the following sections and which is not charged directly or in a related manner to any of the following items on the Bid Form:
- |                     |  |
|---------------------|--|
| Section 01 11 00    | Summary of Work                        |
| Section 01 31 19    | Project Meetings                       |
| Section 01 32 16.19 | Work Scheduling-Bar Chart (Gantt)      |
| Section 01 33 00    | Submittal Procedures                   |
| Section 01 35 29.06 | Health and Safety                      |
| Section 01 52 00    | Construction Site Facilities           |
| Section 01 56 00    | Temporary access and protection works  |
| Section 01 73 00    | Execution of work                      |
| Section 01 74 00    | Cleaning                               |
| Section 01 74 19    | Waste Management and Disposal          |
| Section 01 77 00    | Completion of Work                     |
| Section 01 78 00    | Documents / Submittals Upon Completion |
- .11 Surveying, picketing and survey fees that are not charged to any of the other items in the price schedule.



- .12 Site guarding costs for the entire site.
  - .13 The cost of renting land and / or space for the storage of materials.
  - .14 The protection of existing public utilities on bridges during construction. If the Contractor damages these installations during his work, he must replace them at his own expense;
  - .15 All costs related to the supply of water and electricity throughout the duration of the work;
  - .16 Protective measures and means to prevent damage to the earthwork, paving, etc.;
  - .17 Restoration of the site:
    - .1 All work to restore in their natural state the temporary sites used (access road, storage area, etc.);
    - .2 All work to restore the elements of street furniture (benches, tables, garbage cans, etc.);
    - .3 All work allowing the restoration of vegetation by sodding sites damaged by the work;
    - .4 All work allowing the repair of all other damages and damage that the Contractor has caused on the work site, to the public or private property affected by its work;
  - .18 The Contractor shall repair all damage caused during the performance of his work, to the satisfaction of the owners concerned and that of the Government Representative. The work site must be returned in a state equivalent or better than the one existing before the start of the work;
  - .19 The Contractor must prepare a photo and video survey at the beginning of the project and send a PDF report of these statements with notes and comments on the state of the site.
  - .20 The Contractor shall provide the list of shop drawings required in the drawings and specifications and update it.
- .3 The bid price is paid as follows:
- .1 A first maximum amount of 10% of the lump sum tendered for this item, up to a maximum of 3% of the total of items 2 to 3 of the Bid Form, is payable when the Contractor has fully completed the work mentioned in paragraph 1.7.2.1 Preparatory work for Section 01 11 00 of this specification;
  - .2 A second maximum amount of 15% of the lump sum tendered for this item, up to a maximum of 4% of the total of items 2 to 3 of the Bid Form, is payable when the general mobilization of the Contractor and the installation of construction trailers on the site is fully completed in accordance with this estimate;
  - .3 A third maximum amount of 60% of the lump sum tendered for this item, up to a maximum of 16% of the total of items 2 to 3 of the Bid Form is payable in proportion to the progress of the work of items 2 to 3;
  - .4 The balance of the lump sum tendered for this item is payable when all the work of this contract is fully completed to the satisfaction of the Government

Representative, and that the rehabilitation of the site as well as the general demobilization of the site are fully completed.

**1.2 Item 1.2 - Environmental Protection Measures**

- .1 The price at payment item 1.2 of the Bid Form is a lump sum overall price to offset all costs incurred for environmental protection measures in accordance with the specifications of the drawings and specifications.
- .2 The price includes, but is not limited to, the following:
  - .1 All that is described in Section 01 35 43 - *Environmental Procedures* such as the preparation, presentation and implementation of the Environmental Protection Plan;
  - .2 Preparation, presentation and implementation:
    - .1 Environmental Protection Plan (EPP);
    - .2 Spill contingency plan;
    - .3 Location plan of various site facilities;
    - .4 Work area plans (Gauron and Lafleur bridges);
    - .5 Plan for the prevention of air pollution;
    - .6 Contamination Prevention Plan;
    - .7 Wastewater management plan;
    - .8 Plan for the designation and protection of wetlands and historic, archaeological, cultural and biological resources;
    - .9 A protection plan for the historical and heritage character of the site.
  - .3 Protective measures and means to prevent damage to trees, shrubs, plants, stream bed and its banks, etc.;
  - .4 Temporary facilities to prevent pollution;
  - .5 Incidental expenses and coordination.
- .3 The bid price is paid as follows:
  - .1 A sum corresponding to 20% of the total amount tendered for this position will be paid with the first progress report, provided the work is started; except for the works included in the special mobilization / before works. No payment of this post will be made before the official and permanent mobilization of the works.
  - .2 Other progress payments under this item will be paid on each count at a percentage consistent with that of the overall progress of work for this count, except for the last installment to be paid up to 85% of progress of items 2 to 3..
  - .3 The final 15% will be paid with the payment issued upon the issuance of the "Substantial (Interim) Completion Certificate".

**1.3 Item 1.3 – Cleaning of Surfaces on the Work Site (Droppings)**

- .1 The price at payment item 1.3 of the Bid Schedule is a lump sum overall price to offset all costs incurred for the cleaning of soiled areas in the work area, using a water jet under pressure, in accordance with the provisions of the drawings and specifications.
- .2 The purpose of the clean-up operation is to remove pigeon droppings and other contaminants that pose a threat to the health and safety of workers in the work areas in accordance with Section 01 35 29.06 - *Health and Safety requirements*.
- .3 This task requires a lot of care not to spread the waste into the environment and cause public health problems. The cleaning must be done by an experienced health team.
- .4 Work areas include:
  - .1 Gauron Bridge (7): support surfaces (abutments), deck steel surfaces and main trusses.
  - .2 Lafleur Bridge (7A): the surfaces of the supports (abutments and pier).
- .5 The Contractor must clean the areas mentioned before starting any other work on the bridges.
- .6 The price includes, but is not limited to, the following:
  - .1 Preparation, presentation and correction of the Work Plan;
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 Supply, transportation, handling, maintenance and removal of access required for cleaning;
  - .4 Supply, transportation, handling, maintenance and removal of enclosures required for cleaning;
  - .5 Cleaning surfaces with a pressurized water jet;
  - .6 The loading, transportation and disposal of waste materials from off-site cleaning at a site in compliance with the regulations in effect in the territory of the City of Montreal;
  - .7 The cleaning of the premises at the end of the work;
  - .8 Incidental expenses and coordination.
- .7 The lump sum tendered for this item is payable when all of the work for this item is fully completed to the satisfaction of the Government Representative.

**1.4 Item 1.4 - Platforms and Access System**

- .1 Item 1.4.1 - Platforms and Temporary Access Structures for Gauron Bridge (7)
  - .1 Prices at payment item 1.4.1 of the Bid Form are a lump sum aggregate price to offset all costs of providing, installing and dismantling platforms and any temporary access devices, in accordance with the provisions of the drawings and specifications.

- .2 The access devices are required for the execution of all the work planned on the Lafleur bridge as well as the Gauron bridge including the access devices for the counterweight structure of each bridge.
- .3 The price includes the following, but is not limited to:
  - .1 Preparation, presentation and correction, shop drawings and design calculations;
  - .2 The supply, transportation and handling of all materials required for the manufacture of temporary access;
  - .3 Mobilization of labor, tools and equipment required for the execution of the work;
  - .4 Maintenance and repair of temporary access during the duration of the work;
  - .5 The mobilization of labor, tools and equipment required for the dismantling of temporary access;
  - .6 The dismantling of temporary access devices;
  - .7 Handling and transportation, out of the site, of materials constituting temporary access;
  - .8 Incidental expenses and coordination.
- .4 The bid price is paid as follows for each item:
  - .1 A first maximum amount of 20% of the lump sum tendered for this item, up to 6% of the total of items 2.6 of the Bid Form is payable when the Contractor has fully completed the work mentioned in paragraph 1.9 work. temporary access to Section 01 56 00 of this estimate are completed for a first phase of work on substations 2.6.
  - .2 The balance of the lump sum tendered for this item is payable in proportion to the progress of work on all items 2.6.
  - .3 A final maximum amount of 15% of the lump sum tendered for this item is payable when the work for all items 2.6 is completed and the dismantling of the temporary works for this item is fully completed to the satisfaction of the Government Representative.
  - .4
- .2 Item 1.4.2 - Platforms and Temporary Access Structures for Wall Between Southern Abutment and South Abutment Fondation of Gauron Bridge (7)
  - .1 Prices at payment item 1.4.2 of the Bid Form are a lump sum aggregate price to offset all costs of providing, installing and dismantling platforms and any temporary access devices, in accordance with the provisions of the drawings and specifications.
  - .2 Access devices are required for the execution of the work planned on the south foundation of the Gauron bridge and for the work planned on the south wall between the Gauron and Lafleur bridges
  - .3 The price includes the following, but is not limited to:

- .1 Preparation, presentation and correction, shop drawings and design calculations;
  - .2 The supply, transportation and handling of all materials required for the manufacture of temporary access;
  - .3 Mobilization of labor, tools and equipment required for the execution of the work;
  - .4 Maintenance and repair of temporary access during the duration of the work;
  - .5 The mobilization of labor, tools and equipment required for the dismantling of temporary access;
  - .6 The dismantling of temporary access devices;
  - .7 Handling and transportation, out of the site, of materials constituting temporary access;
  - .8 Incidental expenses and coordination.
- .4 The bid price is paid as follows for each item:
- .1 A first maximum amount of 20% of the lump sum tendered for this item is payable when the Contractor has fully completed the work mentioned in paragraph 1.9 temporary access works of Section 01 56 00 of this specification are completed for one first phase of work on posts 2.2 and 3.1.
  - .2 A second maximum amount of 65% of the lump sum tendered for this item is payable and payable in proportion to the progress of work on all items 2.2 and 3.1.
  - .3 The balance of the lump sum tendered for this item is payable when the work on all items 2.2 and 3.1 is completed and the dismantling of the temporary works for this item is fully completed to the satisfaction of the Government Representative.
- .3 Item 1.4.3 - Platforms and Temporary Access Structures for Gauron Bridge (7) North Abutment Foundation
- .1 Prices at payment item 1.4.3 of the Bid Form are a lump sum aggregate price to offset all costs of providing, installing and dismantling platforms and any temporary access devices, in accordance with the provisions of the drawings and specifications.
  - .2 Access devices are required for the execution of the planned work on the north foundation of the Gauron Bridge
  - .3 The price includes the following, but is not limited to:
    - .1 Preparation, presentation and correction, shop drawings and design calculations;
    - .2 The supply, transportation and handling of all materials required for the manufacture of temporary access;
    - .3 Mobilization of labor, tools and equipment required for the execution of the work;

- .4 Maintenance and repair of temporary access during the duration of the work;
- .5 The mobilization of labor, tools and equipment required for the dismantling of temporary access;
- .6 The dismantling of temporary access devices;
- .7 Handling and transportation, out of the site, of materials constituting temporary access;
- .8 Incidental expenses and coordination.
- .4 The bid price is paid as follows for each item:
  - .1 A first maximum amount of 20% of the lump sum tendered for this item is payable when the Contractor has fully completed the work mentioned in paragraph 1.9 temporary access works of Section 01 56 00 of this specification are completed for one first phase of substation work 2.1.
  - .2 A second maximum amount of 65% of the lump sum tendered for this item is payable and payable in proportion to the progress of work on all items 2.1.
  - .3 The balance of the lump sum tendered for this item is payable when the work of all items 2.1 is completed and the dismantling of the temporary works of this item is fully completed to the satisfaction of the Government Representative.
- .4 Item 1.4.4 - Supply, Installation, Maintenance and Dismantling of Protection System for Work on Counterweight Structure of Lafleur Bridge (7A)
  - .1 Prices at payment item 1.4.4 of the Bid Form are a lump sum aggregate price to offset all costs of providing, installing and dismantling platforms and any temporary access devices, in accordance with the provisions of the drawings and specifications.
  - .2 Access devices are required for the execution of the work planned on the counterweight of the Lafleur bridge (7A)
  - .3 The price includes the following, but is not limited to:
    - .1 Preparation, presentation and correction, shop drawings and design calculations;
    - .2 The supply, transportation and handling of all materials required for the manufacture of temporary access;
    - .3 Mobilization of labor, tools and equipment required for the execution of the work;
    - .4 Maintenance and repair of temporary access during the duration of the work;
    - .5 The mobilization of labor, tools and equipment required for the dismantling of temporary access;
    - .6 The dismantling of temporary access devices;
    - .7 Handling and transportation, out of the site, of materials constituting temporary access;

- .8 Incidental expenses and coordination.
- .4 The bid price is paid as follows for each item:
  - .1 A first maximum amount of 20% of the lump sum tendered for this item is payable when the Contractor has fully completed the work mentioned in paragraph 1.9 temporary access works of Section 01 56 00 of this specification are completed for one first phase of substation work 3.5.
  - .2 A second maximum amount of 65% of the lump sum tendered for this item is payable and payable in proportion to the progress of work on all items 3.5.
  - .3 The balance of the lump sum tendered for this item is payable when the work on all 3.5 items is completed and the dismantling of the temporary works for this item is fully completed to the satisfaction of the Government Representative.

**1.5 Item 1.5 - Containment Enclosure for Gauron Bridge (7)**

- .1 The price at payment item 1.5 of the Bid Form is a lump sum overall price to offset all costs incurred for the supply, installation, maintenance and dismantling of a containment for cleaning and the painting of steel surfaces on site, in accordance with the specifications of the drawings and specifications.
- .2 The containment is required for the cleaning and painting of steel surfaces of the superstructure, including the structure of the counterweight.
- .3 The containment system must be designed to allow the lowering of the access platform while remaining waterproof.
- .4 The price includes, but is not limited to, the following:
  - .1 The preparation, presentation and correction of shop drawings signed and sealed by an engineer in good standing of the Ordre des ingénieurs du Québec (OIQ);
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 The supply, transportation, handling, storage and placement of all materials required for the containment construction;
  - .4 The inspection, maintenance, servicing and repair of the containment during the duration of the work;
  - .5 The recovery, transportation and disposal of residues in accordance with Section 01 74 19 – *Waste Management and Disposal*;
  - .6 Decommissioning and off-site transportation of containment component materials;
  - .7 Incidental expenses and coordination.
- .5 The bid price is paid as follows
  - .1 A first maximum amount of 15% of the lump sum tendered for this item, up to a maximum of 10% of the total of item 2.6.20 of the Bid Form is payable when the Contractor has fully completed the works mentioned in paragraph 1.9 temporary access works in Section 01 56 00 of this estimate have been completed for a first phase of work on item 2.6.20.



- .2 The balance of the lump sum tendered for this item is payable and payable in proportion to the progress of work on item 2.6.20.
- .3 A final maximum amount of 10% of the lump sum tendered for this item is payable when the work for the entire item 2.6.20 is completed and the dismantling of the temporary works for this item is fully completed to the satisfaction of the Government Representative.

**1.6 Item 1.6 - Traffic management by police services**

- .1 The price at payment item 1.6 of the Tender Form is a cost price, per hour of traffic management by police services.
- .2 Traffic management by police services is payable only if required in writing by the Departmental Representative and the amount may be used in whole or in part.
- .3 The cost price is used for traffic management by police services because these works are of such a nature that the costs cannot be estimated exactly.
- .4 At the end of each day, the Government Representative and the Contractor compare their respective registers of time payable in order to agree on a single document, which is signed in two (2) copies by each of the parties. One copy goes to the Departmental Representative and the other to the Contractor.
- .5 When the “cost” modality is applied, the work is done under management, and the calculation of the payments to be made corresponds to the actual costs for the rental of police services in circulation and required vehicle, including tax on goods and services (GST) and the Quebec sales tax (QST).
- .6 Costs .
  - .1 Labor costs .
    - .1 The cost of labor is made up of:
      - .1 Salaries paid to police officers according to the SPVM's current rates for the hiring of police services in circulation;
      - .2 Excluded, overhead, administration and profit.

**Part 2 Item 2. - II - GAURON BRIDGE (N ° 7)**

**2.1 Item 2.1 - Work on North Abutment**

- .1 Item 2.1.1 - North Abutment Foundations with Oversized Repair
  - .1 The price at payment item 2.2.1 of the Bid Form is a price per square meter (m<sup>2</sup>) of new concrete in contact with the formwork, in accordance with the requirements of the drawings and specifications.
  - .2 It should be noted that the repair with thickening of the foundation included the demolition of the concrete, the supply of materials (anchors, etc.) as well as the implementation.
  - .3 The price includes, but is not limited to, the following:



DEMOLITION

- .1 The preparation, presentation and correction of the Work Plan for the demolition of the North abutment foundation;
- .2 The mobilization of labor, tools and equipment required for carrying out the demolition work;
- .3 Saw cuts required;
- .4 Demolition of defective and sound concrete as indicated on the drawings and directives of the Government Representative;
- .5 Removal of steel elements embedded in the concrete, if required;
- .6 The collection of demolition materials, their disposal off-site and their treatment as prescribed in Section 01 74 19 - *Waste Management and Disposal*;

ANCHORS 15M

- .7 The preparation, presentation and correction of shop drawings and the anchor chemical data sheet;
  - .8 The mobilization of labor, tools and equipment required for the execution of the work;
  - .9 Drilling and cleaning of holes for installation of anchors;
  - .10 Supply, handling, transportation and installation of the anchor chemical;
  - .11 Supply, shaping, handling, transportation and installation of steel anchor rods;
  - .12 Performing control anchor tests in accordance with Section 03 30 03 - *Concrete Repairs*;
  - .13 The anchor bar installation confirmation table and a revision of the installation slip;
  - .14 Incidental expenses and coordination.
- .4 The following elements are excluded from this item:
- .1 Anchors, used in place of formwork tie rods, used to hold formwork in place and which are required for the placement of concrete on existing concrete, these anchorages are not the subject of any article in the Bid Form and all costs incurred by the Contractor for the realization of these works are included in the price of formwork.
- .2 Item 2.1.2 - Galvanized Welded Wire Mesh 51x51 MW9,1xMW9,1
- .1 The price at payment item 2.1.2 of the Bid Form is a price per square meter (m<sup>2</sup>) of wire mesh, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but not limited to:
    - .1 Preparation, presentation and correction of the Work Plan, shop drawings concerning the installation of the mesh;
    - .2 Mobilization of the workforce, tools and equipment required to carry out the work;

- .3 The supply of the mesh in the form of flat sheets only as well as the shaping of these in accordance with section 03 20 00 – *Concrete Reinforcing*;
  - .4 Installation of the mesh including the required overlaps;
  - .5 Steel wire used to tie the mesh;
  - .6 Incidental expenses and coordination.
- .3 Item 2.1.3 – Injection Placed type XIV-R Concrete
- .1 The price at payment item 2.1.3 of the Bid Form is a per cubic meter (m<sup>3</sup>) price of type XIV-R concrete, the quantities are calculated according to the actual quantities put in place, in accordance with the specifications of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan relating to shop drawings, the concreting procedure, the specification sheets of the mixtures and the required data sheets;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Substrate treatment before concreting;
    - .4 The supply, installation and dismantling of formwork and formwork tie rods;
    - .5 Supply and application of formwork release agent;
    - .6 The supply and application of repair mortar at the location of formwork tie rods;
    - .7 The supply and application of repair mortar for existing formwork tie-in holes in the north abutment face wall concrete;
    - .8 Supply, installation, finishing, wet curing of concrete;
    - .9 The cleaning of surfaces adjacent to the concreting area;
    - .10 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
    - .11 Concrete finishing, tests and records;
    - .12 Treatment of surplus materials in accordance with the requirements of Section 01 74 19 – *Waste Management and Disposal*;
    - .13 Incidental expenses and coordination.
- .4 Item 2.1.4 – Reparation of Cracks by Injection
- .1 The price at payment item 2.1.4 of the Bid Form is a per linear meter price (lin. m.) For all costs incurred for the repair of cracks by injection. The length of the cracks is measured from the first injector to the last injector; an additional length corresponding to the average spacing between two (2) injectors is added for payment purposes.
  - .2 Each crack to be injected has at any point along its length an opening of at least 0.8 mm.

- .3 Injectors must be "surface" type. The clogging product must be an epoxy modified mortar; it must have sufficient strength to withstand the pressure generated during the injection. The viscosity of the injection product, after addition of the hardener, should be less than 250 cps at about 22 ° C. The date of manufacture of the injection product must be indicated on the containers and must be after March 1st of the year of use. Addition of solvent, thinner or other material to the injection product is prohibited. All products are delivered to the site in their original containers and sealed.
- .4 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction of the Work Plan for crack injection work and product data sheets;
  - .2 The mobilization and demobilization of the workforce, tools and equipment required for carrying out the demolition work;
  - .3 Supply, transportation, handling, maintenance and removal of access required for crack injection;
  - .4 Supply, transportation, handling of all products required for implementation;
  - .5 Clogging product and injectors;
  - .6 The cleaning adjacent surfaces with a pressurized water jet;
  - .7 The cleaning of the premises at the end of the work;
  - .8 Incidental expenses and coordination.

## 2.2 Item 2.2 - Work on South Abutment

- .1 Item 2.2.1 - South Abutment Backwall Repair
  - .1 The price at payment item 2.2.1 of the Bid Form is a price per square meter (m<sup>2</sup>) of new concrete in contact with the formwork, in accordance with the requirements of the drawings and specifications.
  - .2 It should be noted that the repair of the backwall of the southern abutment includes the demolition of the concrete, the supply of materials (Anchors, etc.) and the implementation.
  - .3 The price includes the following, but is not limited to:

DEMOLITION

    - .1 The preparation, presentation and correction of the Work Plan for the partial demolition of the south abutment backwall;
    - .2 The mobilization of labor, tools and equipment required for carrying out the demolition work;
    - .3 Saw cuts required;
    - .4 Demolition of defective and sound concrete as indicated on the drawings and directives of the Government Representative;
    - .5 Removal of steel elements embedded in the concrete, if required;
    - .6 Excavation of granular materials required for demolition;

- .7 The collection of demolition materials, their disposal off site and their treatment in accordance with the provisions of section 01 74 19 – *Waste Management and Disposal*;  
ANCHORS 15M
- .8 The preparation, presentation and correction of shop drawings and the anchor chemical data sheet;
- .9 The mobilization of labor, tools and equipment required for the execution of the work;
- .10 Drilling and cleaning of holes for installation of anchors;
- .11 Supply, handling, transportation and installation of the anchor chemical;
- .12 Supply, shaping, handling, transportation and installation of steel anchor rods;
- .13 Performing control anchor tests in accordance with Section 03 30 03 - *Concrete Repairs*;
- .14 The anchor bar installation confirmation table and a revision of the installation slip;
- .15 Incidental expenses and coordination.
- .4 The following elements are excluded from this item:
  - .1 Anchors, used in place of formwork tie rods, used to hold formwork in place and which are required for placing concrete on existing concrete, these anchors are not subject to any item in the Bid Form and all costs incurred by the Contractor for the realization of these works are included in the price of formwork.
- .2 Item 2.2.2 - Galvanized Reinforcing
  - .1 The price at payment item 2.2.2 of the Bid Form is a price per kilogram (kg) of steel according to the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but not limited to:
    - .1 The preparation, presentation and correction of the Work Plan, shop drawings and the slip concerning the installation of steel bars;
    - .2 Mobilization of the workforce, tools and equipment required to carry out the work;
    - .3 The supply of rebar as well as the shaping of these,
    - .4 Galvanization when stipulated in plans and specifications;
    - .5 Site coordination;
    - .6 Site cuts and adjustments, including painting of cut ends with zinc-rich paint, approved by the Government representative;
    - .7 The installation of the required reinforcing steels, fixed by means of ties of galvanized steel wires to avoid any displacement during the placing of the concrete;

- .8 The rebar installation confirmation table and a revision of the installation slip;
  - .9 Incidental expenses and coordination.
- .3 Item 2.2.3 – Cast-in-place Type V-S Concrete (Backwall)
- .1 The price at payment item 2.2.3 of the Bid Form is a per cubic meter price ( $m^3$ ) of backwall concrete, quantities are calculated according to the theoretical dimensions, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan relating to shop drawings, the concreting procedure, the specification sheets of the mixtures and the required data sheets;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Supply, installation and dismantling of formwork and formwork tie rods;
    - .4 Supply and installation of chamfers;
    - .5 Supply and application of formwork release agent;
    - .6 The supply and application of repair mortar at the location of formwork tie rods;
    - .7 Anchors, used in place of formwork tie rods, to hold formwork in place and required for placement of concrete on existing concrete;
    - .8 Two (2) self-adhesive strips on the construction joint behind the strike-guard wall as indicated on the drawings;
    - .9 Substrate treatment before concreting;
    - .10 Supply, implementation, vibration, finishing, wet curing of type V-S concrete;
    - .11 Cleaning of surfaces adjacent to the concrete zone;
    - .12 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
    - .13 Concrete finishing, tests and records;
    - .14 Treatment of surplus materials in accordance with the requirements of Section 01 74 19 – *Waste Management and Disposal*;
    - .15 Incidental expenses and coordination.
- .4 Item 2.2.4 - South Abutment Foundation with Oversize Repair
- .1 The price at payment item 2.2.4 of the Bid Form is a price per square meter ( $m^2$ ) of new concrete in contact with the formwork, in accordance with the requirements of the drawings and specifications.
  - .2 It should be noted that the overhung repair of the foundation included the demolition of the concrete, the supply of materials (anchors, etc.) as well as the implementation.

- .3 The price includes the following, but is not limited to:
- DEMOLITION
- .1 The preparation, presentation and correction of the Work Plan for the demolition of the North abutment foundation;
  - .2 The mobilization of labor, tools and equipment required for carrying out the demolition work;
  - .3 Saw cuts required;
  - .4 Demolition of defective and sound concrete as indicated on the drawings and directives of the Government Representative;
  - .5 Removal of steel elements embedded in the concrete, if required;
  - .6 The collection of demolition materials, their disposal off-site and their treatment as prescribed in Section 01 74 19 - *Waste Management and Disposal*;
- ANCHORS 15M
- .7 The preparation, presentation and correction of shop drawings and the anchor chemical data sheet;
  - .8 The mobilization of labor, tools and equipment required for the execution of the work;
  - .9 Drilling and cleaning of holes for installation of anchors;
  - .10 Supply, handling, transportation and installation of the anchor chemical;
  - .11 Supply, shaping, handling, transportation and installation of steel anchor rods;
  - .12 Performing control anchor tests in accordance with Section 03 30 03 - *Concrete Repairs*;
  - .13 The anchor bar installation confirmation table and a revision of the installation slip;
  - .14 Incidental expenses and coordination.
- .4 The following elements are excluded from this item:
- .1 Anchors, used in place of formwork tie rods, used to hold formwork in place and which are required for placing concrete on existing concrete, these anchors are not subject to any item in the Bid Form and all costs incurred by the Contractor for the realization of these works are included in the price of formwork.
- .5 Item 2.2.5 - Galvanized Welded Wire Mesh 51x51 MW9,1xMW9,1
- .1 The price at payment item 2.2.5 of the Bid Form is a price per square meter (m<sup>2</sup>) of mesh, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but not limited to:
    - .1 Preparation, presentation and correction of the Work Plan, shop drawings concerning the installation of the mesh;
    - .2 Mobilization of the workforce, tools and equipment required to carry out the work;

- .3 The supply of the mesh in the form of flat sheets only as well as the shaping of these in accordance with section 03 20 00 – *Concrete Reinforcing*;
  - .4 Installation of the mesh including the required overlaps;
  - .5 Steel wire used to tie the mesh;
  - .6 Incidental expenses and coordination.
- .6 Item 2.2.6 – Injection Placed Type XIV-R Concrete
- .1 The price at payment item 2.2.6 of the Bid Form is a price per cubic meter (m<sup>3</sup>) of type XIV-R concrete, the quantities are calculated according to the actual quantities put in place, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan relating to shop drawings, the concreting procedure, the specification sheets of the mixtures and the required data sheets;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Substrate treatment before concreting;
    - .4 The supply, installation and dismantling of formwork and formwork tie rods;
    - .5 Supply and application of formwork release agent;
    - .6 The supply and application of repair mortar at the location of formwork tie rods;
    - .7 Supply, installation, finishing, wet curing of type XIV-R concrete;
    - .8 The cleaning of surfaces adjacent to the concreting area;
    - .9 At the end of the work, off-site disposal of the materials forming the formwork;
    - .10 The treatment of surplus materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
    - .11 Incidental expenses and coordination.
- .7 Item 2.2.7 - Borrow Material MG-112
- .1 The price at payment item 2.2.7 of the Bid Form is a price per ton (t) of MG-112 for the void behind the backwall, in accordance with the requirements of the drawings and specifications.
  - .2 This item relates to materials that replace excavated materials. No reuse of materials is planned.
  - .3 The price includes the following, but is not limited to:
    - .1 Transportation of borrowed materials to site;
    - .2 The provision and installation of borrowing materials according to the drawings, specifications and directives of the Government Representative;
    - .3 Supply, transportation, handling;

- .4 Compaction, tests and registers;
  - .5 Cleaning the premises;
  - .6 The collection of demolition materials, their disposal off-site and their treatment as prescribed in Section 01 74 19 - *Waste Management and Disposal*;
  - .7 Incidental expenses and coordination.
- .8 Item 2.2.8 - Wall Concrete Repair
- .1 The price at payment item 2.2.8 of the Bid Form is a per square meter (m<sup>2</sup>) price of new concrete in contact with the formwork, in accordance with the requirements of the drawings and specifications.
  - .2 It should be noted that the concrete repair of the wall included the demolition of the concrete, the supply of materials (anchors, etc.) as well as the implementation.
  - .3 The price includes the following, but is not limited to:
    - DEMOLITION
    - .1 The preparation, presentation and correction of the Work Plan for the demolition of the North abutment wall;
    - .2 The mobilization of labor, tools and equipment required for carrying out the demolition work;
    - .3 Saw cuts required;
    - .4 Demolition of defective and sound concrete as indicated on the drawings and directives of the Government Representative;
    - .5 Removal of steel elements embedded in the concrete, if required;
    - .6 The collection of demolition materials, their disposal off-site and their treatment as prescribed in Section 01 74 19 - *Waste Management and Disposal*;
    - ANCHORS 15M
    - .7 The preparation, presentation and correction of shop drawings and the anchor chemical data sheet;
    - .8 The mobilization of labor, tools and equipment required for the execution of the work;
    - .9 Drilling and cleaning of holes for installation of anchors;
    - .10 Supply, handling, transportation and installation of the anchor chemical;
    - .11 Supply, shaping, handling, transportation and installation of steel anchor rods;
    - .12 Performing control anchor tests in accordance with Section 03 30 03 - *Concrete Repairs*;
    - .13 The anchor bar installation confirmation table and a revision of the installation slip;
    - .14 Incidental expenses and coordination.
  - .4 The following items are excluded from this item:



- .1 Anchors, used in place of formwork tie rods, used to hold formwork in place and which are required for placing concrete on existing concrete, these anchors are not subject to any item in the Bid Form and all costs incurred by the Contractor for the realization of these works are included in the price of formwork.
- .9 Item 2.2.9 - Galvanized Welded Wire Mesh 51x51 MW9,1xMW9,1
- .1 The price at payment item 2.2.9 of the Bid Form is a price per square meter (m<sup>2</sup>) of mesh, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but not limited to:
    - .1 Preparation, presentation and correction of the Work Plan, shop drawings concerning the installation of the mesh;
    - .2 Mobilization of the workforce, tools and equipment required to carry out the work;
    - .3 The supply of the mesh in the form of flat sheets only as well as the shaping of these in accordance with section 03 20 00 – *Concrete Reinforcing*;
    - .4 Installation of the mesh including the required overlaps;
    - .5 Steel wire used to tie the mesh;
    - .6 Incidental expenses and coordination.
- .10 Item 2.2.10 – Cast-in-place Type V-S Concrete (wall)
- .1 The price at payment item 2.2.10 of the Bid Form is a price per cubic meter (m<sup>3</sup>) of concrete wall, quantities are calculated according to the theoretical dimensions, in accordance with the requirements of drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan relating to shop drawings, the concreting procedure, the specification sheets of the mixtures and the required data sheets;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Supply, installation and dismantling of formwork and formwork tie rods;
    - .4 Supply and installation of chamfers;
    - .5 Supply and application of formwork release agent;
    - .6 The supply and application of repair mortar at the location of formwork tie rods;
    - .7 Anchors, used in place of formwork tie rods, to hold formwork in place and required for placement of concrete on existing concrete;
    - .8 Substrate treatment before concreting;
    - .9 Supply, implementation, vibration, finishing, wet curing of type XIV-R concrete;
    - .10 The cleaning of surfaces adjacent to the concreting area;

- .11 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
- .12 Concrete finishing, tests and registers;
- .13 Treatment of surplus materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
- .14 Incidental expenses and coordination.

## 2.3 Item 2.3 - Deck Joints Replacement

- .1 Item 2.3.1 - Replacement of North Abutment Joint with a Single Elastomeric Seal Joint with Gutter
  - .1 The price at payment item 2.3.1 of the Bid Form is a per linear meter price (lin. m.) for the replacement of the deck joint by an elastomer seal with gutter at north abutment in accordance with the requirements of drawings and specifications.
  - .2 The deck joints of a supplier must be approved by the government representative.
  - .3 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the demolition procedure and Work Plan for the deck joint and the descriptive sheets of the equipment used;
    - .2 Mobilization of labor, tools and equipment required for demolition work;
    - .3 Saw cuts required.
    - .4 Concrete demolition and removal of existing joint;
    - .5 Stripping of surfaces adjacent to the joint;
    - .6 The cleaning of reinforcing steel to be preserved;
    - .7 Cleaning of concrete substrate and disposal of debris;
    - .8 Two (2) self-adhesive strips on the construction joint behind the backwall as indicated on the drawings;
    - .9 The collection of demolition materials, their disposal off-site and their treatment in accordance with the provisions of Section 01 74 19 - *Waste Management and Disposal*;
    - .10 The preparation, presentation and correction of the Work Plan and Shop Drawings of the new deck joint with an elastomer seal and gutter, including the slip relating to the installation of steel bars and anchor as well as the concreting procedure, the descriptive sheets of the mixtures and the required technical data sheets;
    - .11 Mobilization of labor, tools and equipment required to complete the work of the new deck joint;
    - .12 The supply, handling, transportation and installation of the new deck gasket, including field welds and their control;
    - .13 Rebar supply and shaping, galvanizing when specified in drawings and specifications, rebar installation confirmation table, and installation slip

- review. the cuts and adjustments in the building site, the laying of reinforcing steel required;
- .14 Supply, handling, transportation and placement of steel anchor rods and chemical anchor; drilling and cleaning holes for the installation of chemical anchors; performing control anchor tests in accordance with Section 03 30 03 - *Concrete Repairs*; the rebar installation confirmation table and a revision of the installation slip;
  - .15 Supply, installation and dismantling of formwork;
  - .16 Supply, installation, vibration, finishing, wet curing of concrete, finishing of concrete, tests and registers;
  - .17 Treatment of surplus materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .18 Deck joint leak test;
  - .19 Incidental expenses and coordination.
- .2 Item 2.3.2 - Borrow Material MG-20
- .1 The price at payment item 2.3.2 of the Bid Form is a price per ton (t) for borrow material as specified in the drawings and specifications.
  - .2 This item concerns materials that replace excavated material for the replacement of the deck joint with an elastomeric seal with gutter at the north abutment. No reuse of materials is planned.
  - .3 The price includes the following, but is not limited to:
    - .1 Excavation required for joint replacement;
    - .2 The transportation of borrowed materials to the site;
    - .3 The provision and installation of borrowing materials according to the drawings, specifications and directives of the Government Representative;
    - .4 Supply, transportation and handling.
    - .5 Compaction, tests and records;
    - .6 Cleaning the premises;
    - .7 The collection of demolition materials, their disposal off site and their treatment in accordance with the provisions of section 01 74 19 - *Waste Management and Disposal*;
    - .8 Incidental expenses and coordination.
- .3 Item 2.3.3 - Replacement of South Abutment Joint with a Single Elastomeric Seal Joint with Gutter
- .1 The price at payment item 2.3.3 of the Bid Form is a price per linear meter (lin. m.) for the replacement of the deck joint with by an elastomeric seal with gutter at the south abutment, in accordance with the requirements of the drawings and specifications.
  - .2 Item 2.3.3 includes the W410 cut, if required, to allow installation of the deck gasket. Cut steel is to grind and protect with zinc-rich paint.

- .3 The deck joints of a supplier must be approved by the government representative.
- .4
- .5 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction of the demolition procedure and Work Plan for the deck joint and the descriptive sheets of the equipment used;
  - .2 Mobilization of labor, tools and equipment required for demolition work;
  - .3 Saw cuts required.
  - .4 Concrete demolition and removal of existing joint;
  - .5 Stripping of surfaces adjacent to the joint;
  - .6 The cleaning of reinforcing steel to be preserved;
  - .7 Cleaning of concrete substrate and disposal of debris;
  - .8 The collection of demolition materials, their disposal off-site and their treatment in accordance with the provisions of section 01 74 19 - *Waste Management and Disposal*;
  - .9 The preparation, presentation and correction of the Work Plan and Shop Drawings of the new deck joint by an elastomer seal with gutter, including the slip relating to the installation of steel bars and anchor as well as the concreting procedure, the descriptive sheets of the mixtures and the required technical data sheets;
  - .10 The mobilization of labor, tools and equipment required to complete the work of the new deck joint;
  - .11 The supply, handling, transportation and placement of the new deck joint, including field welds and their control;
  - .12 The supply of reinforcement bars and shaping, the galvanizing when stipulated in the drawings and specifications, the reinforcement installation confirmation table and a revision of the installation slip, the cuts and adjustments in the building site, the laying of reinforcing steel required;
  - .13 Supply, handling, transportation and placement of steel anchor rods and chemical anchor; drilling and cleaning holes for the installation of chemical anchors; performing control anchor tests in accordance with Section 03 30 03 - *Concrete Repairs*; the rebar installation confirmation table and a revision of the installation slip;
  - .14 Supply, installation and dismantling of formwork;
  - .15 Supply, installation, vibration, finishing, wet curing of concrete, concrete finishing, tests and registers;
  - .16 Treatment of surplus materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .17 Deck joint leak test;
  - .18 Incidental expenses and coordination.

**2.4 Item 2.4 - Cleaning of Access Shafts**

- .1 The price at payment item 2.4 of the Bid Form is a lump sum overall price to offset all costs incurred for the cleaning of access pits, in accordance with the requirements of drawings and specifications.
- .2 The price includes the following, but is not limited to:
  - .1 Preparation, presentation and correction of the Work Plan;
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 The cleaning of access pits according to the method approved by the Government Representative;
  - .4 The recovery and disposal of residues from the cleaning operation to a site compliant with applicable regulations;
  - .5 Cleaning of manholes to the satisfaction of the Government Representative;
  - .6 The cleaning of the premises at the end of the work;
  - .7 Incidental expenses and coordination.

**2.5 Item 2.5 - Cleaning and Painting - South Abutment Bearing on Site**

- .1 The price at payment item 2.5 of the Bid Form is a lump sum overall price to offset all costs of cleaning and painting the steel surfaces of the South abutment bearings, in accordance with the requirements of drawings and specifications.
- .2 **Note that the existing paint on the bearings contains lead.** The Contractor must adjust its price to consider CNESST's requirements for lead exposure during stripping.
- .3 The price includes the following, but is not limited to:
  - .1 Preparation, presentation and correction of the Work Plan;
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 The cleaning of steel surfaces according to the method approved by the Government Representative;
  - .4 The recovery and disposal of the residues of the cleaning operation to a site in compliance with applicable regulations;
  - .5 The painting of steel surfaces in the field of support equipment when the cleaning is completed to the satisfaction of the Government Representative;
  - .6 The cleaning of the premises at the end of the work;
  - .7 Incidental expenses and coordination.

**2.6 Item 2.6 – Steel Structure Reinforcement**

**Note that the existing paint of the steel structure contains lead.**

The Contractor must adjust its price to consider CNESST's requirements for lead exposure.

- .1 Item 2.6.1 - Reinforcement Diagonal 0-1 (South Side) - Truss P1 and P2

- .1 The price at payment item 2.6.1 of the Bid Form is a unit price that covers all costs for reinforcement work on a diagonal of a triangulated bridge truss, in accordance with the requirements of the drawings and specifications.
- .2 Reinforcements must be installed at existing diagonals located between points 0 and 1, triangulated bridge truss, East and West.
- .3 The price includes the following, but is not limited to:
  - .1 Preparation, presentation and correction of Shop Drawings and Work Plan for installation of plates, reinforcing and splicing plates;
  - .2 Shop supply, shaping, cleaning and painting of plates, reinforcing and splicing plates;
  - .3 Handling, transportation and storage of plates, reinforcing and splicing plates on site;
  - .4 The mobilization of labor, tools and equipment required for the execution of the work;
  - .5 Removal of existing parts as shown on drawings and disposal of materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .6 Measurement, marking and drilling of holes in existing chords for installation of plates, reinforcing and splicing plates;
  - .7 Provision of bolts and washers required for bolting plates, reinforcing and splicing plates;
  - .8 Installation and bolting of plates, reinforcement and splice plates;
  - .9 Painting retouching;
  - .10 Incidental expenses and coordination.
- .2 Item 2.6.2 to 2.6.18 – Reinforcement of Bridge Assemblies
  - .1 The price at payment items 2.6.2 to 2.6.18 of the Bid Form are unit prices that cover all costs for reinforcement work on each of the bridge assemblies, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of shop drawings and the Work Plan for the installation of reinforcement plates;
    - .2 The supply, shaping, cleaning and painting of reinforcement plates in the workshop;
    - .3 Handling, transportation and storage of reinforcing plates on site;
    - .4 The mobilization of labor, tools and equipment required for the execution of the work;
    - .5 Removal of existing parts as shown on drawings and disposal of materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .6 Measurement, marking and drilling of holes in existing chords for installation of reinforcement plates;
    - .7 Supply of bolts and washers required for bolting reinforcement plates;
    - .8 Installation and bolting of reinforcement plates;

- .9 Painting retouching;
- .10 Incidental expenses and coordination.
- .3 Item 2.6.19 - Supply and Installation of Batten Plates / Laces
  - .1 The price at payment item 2.6.19 of the Bid Form is a unit price that covers all costs for bridge batten plate / lacing replacement works in accordance with the requirements of the drawings and specifications.
  - .2 For estimation, the average size of the plates is 318 x 686 x 9.5 mm and 2 rows of 5 rivets. In addition, these connecting plates are located on top of the bottom chord.
  - .3 The price includes the following, but is not limited to:
    - .1 The preparation, layout and correction, if required, of shop drawings and Work Plan for the installation of batten plates / laces;
    - .2 The supply, shaping, cleaning and painting in the workshop of batten plates / laces;
    - .3 Handling, transportation and storage of batten plates / lacing on site;
    - .4 The mobilization of labor, tools and equipment required for the execution of the work;
    - .5 Measurement, marking and drilling holes in existing chords for the installation of batten plates / laces;
    - .6 The supply of bolts and washers required for the bolting of batten plates / laces;
    - .7 Installation and bolting of batten plates / laces;
    - .8 Painting retouching;
    - .9 Incidental expenses and coordination.
- .4 Item 2.6.20 Cleaning and Painting - Steel Surfaces On Site
  - .1 The price at payment item 2.6.20 is a lump sum overall price to offset all costs of cleaning and painting the steel surfaces of the entire superstructure, including the structure counterweight, the pivot pin and the part inside the access pit.
  - .2 in accordance with the requirements of the drawings and specifications.
  - .3
  - .4 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan, the painting procedure, samples and data sheets required;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 The cleaning of steel surfaces according to the method approved by the Government Representative;
    - .4 The recovery and disposal of residues from the cleaning operation to a site that complies with the applicable regulations;



- .5 The supply, handling, transportation and implementation of the painting;
  - .6 All work shall be performed in accordance with sections 05 12 33 - *Structural steel for bridges* and 09 91 13.23 - *Exterior painting of structural steel*;
  - .7 The painting of the steel surfaces in the construction of the existing superstructure, including the structure of the counterweight, assembly, the rails and railings including those of the South approach and retouching, when the cleaning is completed to the satisfaction of the Government Representative;
  - .8 In the event of damage, immediately repair the affected items at the expense of the Contractor;
  - .9 Treatment of surplus materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .10 The cleaning of the premises at the end of the work;
  - .11 Incidental expenses and coordination.
- .5 This item excluded:
- .1 The painting of steel surfaces in the factory. All costs incurred by the contractor to perform work on factory painted parts, including the cost of supply, materials and equipment, transportation and implementation, are included in the price of the works which require the application of paint.
- .6 For estimation, the area to be painted at Gauron Bridge is  $\pm 4,700 \text{ m}^2$ .

## 2.7 **Item 2.7 - Replacement of Rolling Surface - Bridge and Approach Tunnel**

- .1 Item 2.7.1 Stripping Bridge and Approach Tunnel Slabs
- .1 The price at payment item 2.7.1 of the Bid Form is the price per square meter ( $\text{m}^2$ ) for the removal of the existing bituminous mix and waterproofing membrane on the slab of the bridge and tunnel located on the above the bike path, in accordance with the requirements of the drawings and specifications.
  - .2 The stripping is carried out by means of a material which must not damage the slab nor the other elements of the structure and whose mass does not have to exceed the displayed capacity of the bridge.
  - .3 Any damage caused to the slab or other deck elements by stripping must be repaired at the expense of the contractor.
  - .4 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for asphalt removal work, including the description of the equipment used for the stripping;
    - .2 The saw cuts required to delineate the area of removal of bituminous mix;
    - .3 Removal of bituminous mix and waterproofing membrane;
    - .4 Cleaning after removal;



- .5 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .6 Collection of cleaning materials and their treatment as prescribed in Section 01 74 19 - *Waste Management and Disposal*;
  - .7 Incidental expenses and coordination.
- .2 Item 2.7.2 Surface Repairs of Slab (<100 mm)
- .1 The price at payment item 2.7.2 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for surface repairs to the slab, in accordance with the requirements of the drawings and specifications as well as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the surface repair of the slab;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Preparation, presentation and correction of the Demolition Work Plan;
    - .4 Saw cuts required;
    - .5 The demolition of unsound concrete to sound concrete as per the drawings and instructions of the Departmental Representative;
    - .6 The protection of the reinforcement to be preserved;
    - .7 The collection of demolition materials, their disposal off site and their treatment in accordance with the provisions of section 01 74 19 - *Waste Management and Disposal*;
    - .8 Preparation, presentation and correction of Work Plan for shop drawings, concreting procedure, specification sheets of blends and data sheets required;
    - .9 The treatment of the substrate before concreting;
    - .10 Supply, installation, vibration, finishing, wet cure of type XIV-R or XIV-C concrete;
    - .11 The cleaning of surfaces adjacent to the concreting area;
    - .12 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
    - .13 Concrete finishing, tests and records;
    - .14 The treatment of surplus materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
    - .15 Incidental expenses and coordination.
- .3 Item 2.7.3 Deep Repairs of Slab (> 100 mm)
- .1 The price at payment item 2.7.3 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for the repair work at depth of the slab, including the first

100 mm, in accordance with requirements of drawings and specifications and as directed by the Government Representative.

- .2 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction of the Work Plan for the surface repair of the slab;
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 Preparation, presentation and correction of the Demolition Work Plan;
  - .4 Saw cuts required;
  - .5 The demolition of unsound concrete to sound concrete as well as to the indications in the drawings and the instructions of the Government Representative;
  - .6 The protection of the reinforcement to be preserved;
  - .7 The collection of demolition materials, their disposal off site and their treatment in accordance with the provisions of section 01 74 19 - *Waste Management and Disposal*;
  - .8 Preparation, presentation and correction of Work Plan for shop drawings, concreting procedure, specification sheets of blends and data sheets required;
  - .9 The treatment of the substrate before concreting;
  - .10 Supply, installation and dismantling of formwork;
  - .11 The supply, the implementation, the vibration, the finish, the wet cure of concrete type V-S with coarse aggregate 5-14 mm;
  - .12 Cleaning of surfaces adjacent to the concrete zone;
  - .13 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
  - .14 Concrete finishing, tests and records;
  - .15 The treatment of surplus materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
  - .16 Incidental expenses and coordination.
- .4 Item 2.7.4 - Galvanized Reinforcing
  - .1 The price at payment item 2.7.4 of the Bid Form is a price per kilogram (kg) of steel according to the quantities placed in the formwork, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but not limited to:
    - .1 The preparation, presentation and correction of the Work Plan, shop drawings and the slip concerning the installation of steel bars;
    - .2 Mobilization of the workforce, tools and equipment required to carry out the work;
    - .3 The supply of rebar as well as the shaping of these,

- .4 Galvanization when stipulated in plans and specifications;
  - .5 Site coordination;
  - .6 Site cuts and adjustments, including painting of cut ends with zinc-rich paint, approved by the Government representative;
  - .7 The installation of the required reinforcing steels, fixed by means of ties of galvanized steel wires to avoid any displacement during the placing of the concrete;
  - .8 The rebar installation confirmation table and a revision of the installation slip;
  - .9 Incidental expenses and coordination.
- .5 Item 2.7.5 Cleaning of Deck Surfaces
- .1 The price at payment item 2.7.5 of the Bid Form is a per square meter (m<sup>2</sup>) price of cleaned slab surface in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The supply and transportation of all materials required for the cleaning of the slab;
    - .2 The mobilization of labor, tools and equipment required for the completion of all stages of cleaning slab surfaces;
    - .3 The implementation of cleaning;
    - .4 The cleaning of the premises at the end of the work;
    - .5 Treatment of materials resulting from the cleaning in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
    - .6 Incidental expenses and coordination.
- .6 Item 2.7.6 Correction of Deck Surfaces
- .1 The price at payment item 2.7.6 of the Bid Form is a price per square meter (m<sup>2</sup>) for the correction of deck and tunnel slab surfaces, in accordance with the requirements of the drawings and specifications.
  - .2 The relief at all points of the slab surfaces is evaluated by the Government Representative using the volumetric method described in ASTM E965 Standard Test Method for Measuring Pavement Macrotexture Depth Using a Volumetric Technique. The volume of sand or glass beads used for the test is 25 cm<sup>3</sup>. The minimum average patch diameter of each measurement must be greater than 165 mm.
  - .3 Non-conforming surfaces must be corrected by filling the cavities with a bagged cement mortar or grinding the asperities. The Contractor must indicate to the Government Representative the surfaces to be grinded and wait for authorization before grinding.
  - .4 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the correction of slab surfaces and the specifications of the cement mortar mix;

- .2 The supply and transportation of all materials required for the correction of cementitious mortar surfaces;
  - .3 Mobilization of labor, tools and equipment required for the execution of the work;
  - .4 Implementation;
  - .5 Cleaning surfaces to correct;
  - .6 The cleaning of the premises at the end of the work;
  - .7 Treatment of materials resulting from cleaning in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .8 Incidental expenses and coordination.
- .7 Item 2.7.7 Placement of Waterproofing Membrane
- .1 The price at payment item 2.7.7 of the Bid Form is a price per square meter (m<sup>2</sup>) for laying the waterproofing membrane on the deck and tunnel slab, depending on the actual surface covered, without the addition of overlaps and flashings in accordance with the requirements of the drawings and specifications.
  - .2 A bonding coat must be applied at the rate of 0.15 l / m<sup>2</sup> on the surfaces to be covered with a waterproofing membrane; this rate is calculated before evaporation of the solvent or water. The bonding layer must be that specified by the manufacturer of the waterproofing membrane;
  - .3 The Contractor shall protect against splash, sidewalks, bike paths, curbs, guardrails, railings, deck joints, etc., using canvas or other suitable material; the bonding layer shall be rolled along these elements over a minimum width of 600 mm.
  - .4 The implementation of the waterproofing membrane must be carried out after a minimum delay of 12 hours after the installation of the bonding layer, without exceeding 24 hours, on dry and clean surfaces.
  - .5 The installation of the waterproofing membrane must be carried out from the low points of the surfaces to be covered towards the high point of the transverse profile. The transverse joints must be staggered so as not to superimpose more than 3 membrane thicknesses at the same point. The overlap width of the joints is 75 mm for the longitudinal joints and 150 mm for the transverse joints. The membrane should be placed as close as possible to curbs, sidewalks, bike lanes, guardrails, drains and deck joints, without exceeding 15 mm.
  - .6 After laying each membrane strip, the poorly welded overlapping joints must be welded again. Once the installation is complete, the membrane is carefully inspected; the air pockets and the folds must be pierced and covered with a piece of membrane exceeding at least 100 mm around the membrane area to be repaired.
  - .7 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the work plan for the installation of the waterproofing membrane and the descriptive sheets of the materials;

- .2 The supply and transportation of all materials required for the installation of the waterproofing membrane;
  - .3 Mobilization of labor, tools and equipment required for the execution of the work;
  - .4 The supply, loading, transportation and application of the bonding binder for the waterproofing membrane;
  - .5 The installation of the waterproofing membrane;
  - .6 The cleaning of the premises at the end of the work;
  - .7 Treatment of materials resulting from cleaning in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .8 Incidental expenses and coordination.
- .8 Item 2.7.8 Placement of Bituminous Mix
- .1 The price at payment item 2.7.8 of the Bid Form is a price per square meter (m<sup>2</sup>) of bituminous mix placed on the bridge and the tunnel, in accordance with the requirements of the drawings and specifications.
  - .2 The installation of the asphalt is carried out within a maximum of three (3) days after the installation of the waterproofing membrane. The days where the weather conditions are unfavorable in the sense of the requirements of implementation of the prepared mix and put in heat are excluded from the calculation of this time of execution.
  - .3 All traffic is prohibited on the newly installed asphalt until the surface temperature of the asphalt is below 85 ° C.
  - .4 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for bituminous mix works, including the description of the material used for the installation and the data sheets for the bituminous mix and binder;
    - .2 The supply and transportation of all materials required for the manufacture of asphalt;
    - .3 Mobilization of labor, tools and equipment required for the execution of the work;
    - .4 The supply, loading, transportation and application of the bonding binder;
    - .5 Supply, loading, application and compaction of asphalt;
    - .6 The cleaning of the premises at the end of the work;
    - .7 Treatment of materials resulting from cleaning in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .8 Incidental expenses and coordination.
- .9 Item 2.7.9 Surface Concrete Repairs of Sidewalk
- .1 The price at payment item 2.7.9 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for pavement surface repairs, in accordance with the requirements of the drawings and specifications.

- .2 The price includes the following, but is not limited to:
  - .1 Preparation, layout and correction, if required, of the Work Plan and concrete mix specifications for the sidewalk repair;
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 Saw cuts required;
  - .4 Substrate treatment before concreting;
  - .5 Supply, implementation, vibration, finishing, wet curing of concrete;
  - .6 Supply, shaping, handling, transportation and installation of reinforcement if required;
  - .7 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*.
  - .8 Incidental expenses and coordination.

## 2.8 Item 2.8 – Replacement of Rolling Surface - Approach

- .1 Item 2.8.1 Removal of Bituminous Pavement
  - .1 .1 The price at payment item 2.8.1 of the Bid Form is the price per square meter (m<sup>2</sup>) of bituminous mix removed at the approaches and disposed off the job site in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for asphalt removal work, including the description of the equipment used for the stripping;
    - .2 The saw cuts required to delineate the area of removal of bituminous mix;
    - .3 Bituminous mix removal;
    - .4 Cleaning after removal;
    - .5 Collection of cleaning materials and their treatment as specified in Section 01 74 19 - *Waste Management and Disposal*;
    - .6 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .7 Incidental expenses and coordination.
- .2 Item 2.8.2 Removal of W-Beam Guide Rail Profile on Wooden Posts at North Approach
  - .1 The price at payment item 2.8.2 of the Bid Form is a per linear meter price (lin. m.) for the removal and disposal of W-Beam guide rail at the North approach, including steel rails and wooden posts and all related items in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The mobilization of labor, tools and equipment and hardware required for the execution of the work;

- .2 Disposal of materials in accordance with Section 07 74 19 - *Waste Management and Disposal*;
- .3 Incidental expenses and coordination.
- .3 Item 2.8.3 Supply and Installation of New W-Beam Guide Rail on Wooden Posts at North Approach
  - .1 The price at payment item 2.8.3 of the Bid Form is a per linear meter price (lin. m.) for the supply and installation of new W-Beam guide rail to the North approach, in accordance with the requirements of drawings and specifications. The W-Beam guide rail is measured on the central axis of the guardrail from the center of the first post to the center of the last post.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of shop drawings of W-Beam guide rail on wooden posts of the North approach;
    - .2 The supply and transportation of posts, spacers, double-corrugated steel sections, accessories, all bolts and other materials required for the performance of the work;
    - .3 Mobilization of labor, tools and equipment required for the execution of the work;
    - .4 The implementation of W-Beam guide rail on wooden posts at North approach;
    - .5 The cleaning of the premises at the end of the work;
    - .6 Treatment of materials resulting from cleaning in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
    - .7 Incidental expenses and coordination.
- .4 Item 2.8.4 Removal of W-Beam Guide Rail at South Approach
  - .1 The price at payment item 2.8.4 of the Bid Form is a per linear meter price (lin. m.) for the removal and disposal of W-Beam guide rail at the South approach, including steel rails and all related items in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The mobilization of labor, tools and equipment and hardware required for the execution of the work;
    - .2 Disposal of materials in accordance with Section 07 74 19 - *Waste Management and Disposal*;
    - .3 Incidental expenses and coordination.
- .5 Item 2.8.5 Supply and Installation of W-Beam Guide Rail at South Approach
  - .1 The price at payment item 2.8.5 of the Bid Form is a per linear meter price (lin. m.) for the supply and installation of new W-Beam guide rail to the South approach, in accordance with the requirements of drawings and specifications. The W-Beam guide rail is measured on the central axis of the guardrail from the center of the first post to the center of the last post.



- .2 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction of shop drawings of W-Beam guide rail of the South approach;
  - .2 The supply and transportation spacers, double-corrugated steel sections, accessories, all bolts and other materials required for the performance of the work;
  - .3 Mobilization of labor, tools and equipment required for the execution of the work;
  - .4 The implementation of W-Beam guide rail at South approach;
  - .5 The cleaning of the premises at the end of the work;
  - .6 Treatment of materials resulting from cleaning in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
  - .7 Incidental expenses and coordination.
- .6 Item 2.8.6 Replacement of Guardrail Post Anchorages
  - .1 The price at payment item 2.8.6 of the Bid Form is a unit price for the guardrail post for which the anchorages are to be replaced in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 Preparation, presentation and correction of work plan and shop drawings necessary to replace anchorages;
    - .2 Data sheets for concrete curbs;
    - .3 The local demolition and rebuilding of concrete curbs, including steel cover plates;
    - .4 Supply and transportation of all required materials;
    - .5 The supply, installation and dismantling of the required formwork;
    - .6 Supply, implementation, vibration, finishing, wet curing of concrete;
    - .7 The mobilization of labor, tools and equipment required for the execution of the work;
    - .8 Removal of anchorages and anchor plates and their off-site disposal in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .9 The supply, transport and installation of new anchorages with nuts and plates;
    - .10 The cleaning of the premises at the end of the work;
    - .11 Treatment of cleaning materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
    - .12 Incidental expenses and coordination.
- .7 Item 2.8.7 Placement of Bituminous Mix
  - .1 .1 The price at payment item 2.8.7 of the Bid Form is a price per square meter (m<sup>2</sup>) of bituminous mix placed at the approaches, in accordance with the requirements of the drawings and specifications.



- .2 The price includes the following, but is not limited to:
  - .1 Mobilization of labor, tools and equipment required for the execution of the work;
  - .2 The supply and transportation of all materials required for the work; the supply, loading, transport and application of the binder;
  - .3 The supply, loading, transportation, implementation and compaction of bituminous mix;
  - .4 The implementation of the pavement joint with the existing;
  - .5 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*.
  - .6 The cleaning of the premises at the end of the work;
  - .7 Treatment of materials resulting from cleaning in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .8 Incidental expenses and coordination.

**2.9 Item 2.9 - Work on Counterweight System**

- .1
- .2 Item 2.9.1 Removal of Loose Concrete from Surfaces
  - .1 The price at payment item 2.9.1 of the Bid Form is a per square meter (m<sup>2</sup>) price of loose concrete demolished on the counterweight surface in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the demolition of loose concrete on counterweight surfaces;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 The demolition of loose concrete surfaces;
    - .4 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .5 Incidental expenses and coordination.
- .3 Item 2.9.2 Without Oversize Concrete Repair of Counterweights
  - .1 The price at payment item 2.9.2 of the Bid Form is a price per square meter (m<sup>2</sup>) of repaired concrete surface, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the partial demolition of counterweight concrete;
    - .2 The mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Saw cuts required;

- .4 Demolition of unsound concrete to healthy concrete as per the indications on the drawings and the directives of the Government Representative;
  - .5 Protection of the reinforcement to be preserved;
  - .6 Collection of demolition materials, their disposal off site and their treatment according to the prescriptions of section 01 74 19 - *Waste Management and Disposal*;
  - .7 Preparation, presentation and correction of shop drawings and chemical data sheet of anchor;
  - .8 Supply, installation and dismantling of required formwork;
  - .9 Supply and installation of formwork tie rods;
  - .10 Supply and application of formwork release agent;
  - .11 Supply and installation of steel ligature wire;
  - .12 Drilling and cleaning of holes for the installation of chemical anchors;
  - .13 The supply, handling, transportation and placement of the chemical anchor;
  - .14 The supply, shaping, handling, transportation and installation of steel anchor rods;
  - .15 The preparation, presentation and correction of the Work Plan concerning the shop drawings, the concreting procedure, description sheets of the mix and technical sheets required;
  - .16 Substrate treatment before concreting;
  - .17 Supply, installation, vibration, finishing, wet curing of type XIV-R or XIV-C concrete;
  - .18 The cleaning of concrete surfaces adjacent to the concreting area;
  - .19 The supply and application of repair mortar at formwork tie rods;
  - .20 At the end of the work, the off-site disposal of the materials making up the formwork and the correction of defective repairs;
  - .21 Concrete finishing, tests and registers;
  - .22 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*.
  - .23 Incidental expenses and coordination.
- .4 Item 2.9.3 - Galvanized Welded Wire Mesh 51x51 MW9,1xMW9,1
- .1 The price at payment item 2.9.3 of the Bid Form is a price per square meter (m<sup>2</sup>) of mesh, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but not limited to:
    - .1 Preparation, presentation and correction of the Work Plan, shop drawings concerning the installation of the mesh;
    - .2 Mobilization of the workforce, tools and equipment required to carry out the work;

- .3 The supply of the mesh in the form of flat sheets only as well as the shaping of these in accordance with section 03 20 00 – *Concrete Reinforcing*;
  - .4 Installation of the mesh including the required overlaps;
  - .5 Steel wire used to tie the mesh;
  - .6 Incidental expenses and coordination.
- .5 Item 2.9.4 Counterweight Concrete Waterproofing
- .1 The price at payment item 2.9.4 of the Bid Form is a price per square meter (m<sup>2</sup>) of waterproofed area, to offset all costs of cleaning and waterproofing the concrete surfaces of the counterweights, in accordance with the requirements of the drawings and specifications.
  - .2 The treated surfaces must be protected from rain and splashing for a period of six (6) hours following the application of the waterproofing.
  - .3 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the work plan and data sheets of the waterproofing product;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 The cleaning of concrete surfaces according to the method approved by the Government Representative;
    - .4 The recovery and disposal of the residues of the cleaning operation to a site in compliance with the applicable regulations;
    - .5 The application of the waterproofing agent to the concrete surfaces of the counterweight system, in the field, when the cleaning is completed to the satisfaction of the Government Representative;
    - .6 The cleaning of the premises at the end of the work;
    - .7 Incidental expenses and coordination.
- .6 Item 2.9.5 Partial Dismantling of Catwalk and Railings of Counterweight Structure
- .1 The price at payment item 2.9.5 of the Bid Form is a lump sum overall price for the partial dismantling and removal of the catwalks and railing of the counterweight, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the partial dismantling of catwalk and balustrades of the counterweight;
    - .2 The mobilization of labor, tools and equipment required for the dismantling of catwalk and railings;
    - .3 Off-site transportation of protective system materials;
    - .4 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .5 Incidental expenses and coordination.

.7 Item 2.9.6 Counterweights Plywood Replacement

- .1 The price at Payment item 2.9.6 of the Bid Form is a price per square meter (m<sup>2</sup>) of plywood surface replaced at the counterweight, in accordance with the requirements of the drawings and specifications.
- .2 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction of the Work Plan for the replacement of plywood of the counterweight;
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 The dismantling of existing plywood to be replaced, including connecting pieces and any other related items;
  - .4 The recovery and disposal of the residues of the cleaning operation to a site in compliance with the applicable regulations;
  - .5 The supply, installation and finishing of wood plywood panels, connecting pieces and all related items required for the execution of the work as specified in specifications and drawings;
  - .6 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .7 The cleaning of the premises at the end of the work;
  - .8 Incidental expenses and coordination.

**2.10 Item 2.10 - Supply and Installation of Height Limitation Signs**

- .1 The price at Payment item 2.10 of the Bid Form is a per square meter (m<sup>2</sup>) price of signage area, in accordance with the requirements of the drawings and specifications.
  - .1 The price includes the following, but is not limited to:
    - .1 Preparation, presentation and correction of shop drawings;
    - .2 The mobilization of labor, tools and equipment required for the dismantling of existing panels to be removed;
    - .3 Decommissioning and off-site disposition of existing signage;
    - .4 The mobilization of labor, tools and equipment required for the execution of the work;
    - .5 The supply, transportation and handling of all materials required for the manufacture and installation of height limitation signs, including hardware;
    - .6 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .7 Incidental expenses and coordination.

**2.11 Item 2.11 - Permanent marking of the roadway**

- .1 The price at payment station 2.11 is a price per linear meter (lin.) Of marked line, in accordance with the specifications of the estimate and the drawings as well as according to the directives of the Government Representative.
- .2 The price covers in particular the following, but is not limited to:
  - .1 The preparation, presentation and correction, if necessary, of the Work Plan
  - .2 Cleaning of surfaces by sweeping;
  - .3 Pre-marking;
  - .4 Supply and application of paint and glass beads,
  - .5 Temporary delineators (T-RV-12) that may be required;
  - .6 Temporary signage required during these operations;
  - .7 Any incidental expense.
- .3 When the width of a drawn line is different from the base width of 120 mm (eg: stop lines, crosswalk), the calculation of the payable length is made according to the following method:

$$L \text{ (m)} = \frac{\text{Actual width (in mm)} \times \text{length (in m)}}{120 \text{ mm}}$$

**2.12 Item 2.12 - Replace the cover of the North-East access pit**

- .1 The price at payment station 2.12 of the Tender Form is an overall lump sum price, for the replacement of the access well cover in accordance with the prescriptions of the plans and specifications.
- .2 The price covers in particular the following, but is not limited to:
  - .1 Preparation, presentation and correction of shop drawings;
  - .2 Mobilization of manpower, tools and equipment required for the dismantling of existing panels to be removed;
  - .3 Dismantling and disposal off site of existing plywood sheets and wooden supports;
  - .4 Mobilization of manpower, tools and equipment required for carrying out the work;
  - .5 The supply, transport and handling of all materials required for the fabrication and installation of the access shaft cover, the galvanized checkered plate, Angle sections, including hardware, welds and anchors;
  - .6 The various cut of the galvanized checkered plate;
  - .7 The collection of demolition materials and their treatment according to the prescriptions of section 01 74 19 - Waste management and disposal;
  - .8 All incidental expenses and coordination.

**Part 3            Item 3. - III - LAFLEUR BRIDGE (N ° 7A)**

**3.1                Item 3.1 - Repair Work on Wall Between Southern Abutments**

.1                Item 3.1.1 Without Oversize Concrete Repair of Wall

- .1                The price at payment item 3.1.1 of the Bid Form is a per square meter (m<sup>2</sup>) price repaired, in accordance with the drawings and specifications.
- .2                The price includes the following, but is not limited to:
  - .1                The preparation, presentation and correction of the Work Plan for the partial demolition of the wall;
  - .2                The mobilization of labor, tools and equipment required for carrying out concrete demolition work as indicated on the drawings;
  - .3                Saw cuts required;
  - .4                Demolition of unsound concrete to healthy concrete as per the indications on the drawings and the directives of the Government Representative;
  - .5                Protection of the reinforcement to be preserved;
  - .6                Collection of demolition materials, their disposal off site and their treatment according to the prescriptions of section 01 74 19 - *Waste Management and Disposal*;
  - .7                The preparation, presentation and correction, if required, of the shop drawings and the technical data sheet of the chemical anchors;
  - .8                Supply, installation and dismantling of required formwork;
  - .9                Supply and installation of formwork tie rods;
  - .10                Supply and application of formwork release agent;
  - .11                Supply and installation of steel ligature wire;
  - .12                Drilling and cleaning of holes for anchor installation;
  - .13                The supply, handling, transportation and placement of the chemical anchor;
  - .14                The supply, shaping, handling, transportation and installation of steel anchor rods;
  - .15                Preparation, presentation and correction of the work plan for the shop drawings, the concreting procedure, description sheets of the mix and technical sheets required;
  - .16                Substrate treatment before concreting;
  - .17                The supply, installation, vibration, finishing, wet curing of type XIV-R or XIV-C concrete;
  - .18                Cleaning of surfaces adjacent to the concreting area;
  - .19                The supply and application of repair mortar at the location of formwork tie rods;
  - .20                At the end of the work, the off-site disposal of the materials making up the formwork and the correction of defective repairs;

- .21 Concrete finishing, tests and registers;
  - .22 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*.
  - .23 Incidental expenses and coordination.
- .2 Item 3.1.2 - Galvanized Welded Wire Mesh 51x51 MW9,1xMW9,1
- .1 The price at payment item 3.1.2 of the Bid Form is a price per square meter (m<sup>2</sup>) of mesh, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but not limited to:
    - .1 Preparation, presentation and correction of the Work Plan, shop drawings concerning the installation of the mesh;
    - .2 Mobilization of the workforce, tools and equipment required to carry out the work;
    - .3 The supply of the mesh in the form of flat sheets only as well as the shaping of these in accordance with section 03 20 00 – *Concrete Reinforcing*;
    - .4 Installation of the mesh including the required overlaps;
    - .5 Steel wire used to tie the mesh;
    - .6 Incidental expenses and coordination.
- .3 Item 3.1.3 Supply and Installation of Rung
- .1 The price at payment item 3.1.3 of the Bid Form is a unit price for the supply and serial installation of rungs, in accordance with the requirements of the drawings and specifications.
  - .2 The existing serial consists of eight rows of rungs on the face and one on the top. In case of variation, the rungs will be paid proportionally.
  - .3 The price includes the following, but is not limited to:
    - .1 Georeferenced survey, preparation, presentation and correction, shop drawings, samples and data sheets required. Provide a DWG, PDF and EXCEL spreadsheet with identification, location and any other relevant information about the height of the rows, numbers, spaces between them, type, shape and identification section;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 The supply, transportation, handling and installation of rungs, such as the plan;
    - .4 Incidental expenses and coordination.
- 3.2 Item 3.2 - Work at Deck Joints**
- .1 Item 3.2.1 Replacement of South Abutment Joint with a Single Elastomeric Seal Joint with Gutter

- .1 The price at payment item 3.3.1 of the Bid Form is a per linear meter price (lin. m.) for the replacement of the deck joint by an elastomer seal with gutter at South abutment in accordance with the requirements of drawings and specifications.
- .2 The deck joints of a supplier must be approved by the government representative.
- .3 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction of the demolition procedure and Work Plan for the deck joint and the descriptive sheets of the equipment used;
  - .2 Mobilization of labor, tools and equipment required for demolition work;
  - .3 Saw cuts required.
  - .4 Concrete demolition and removal of existing joint;
  - .5 Stripping of surfaces adjacent to the joint;
  - .6 The cleaning of reinforcing steel to be preserved;
  - .7 Cleaning of concrete substrate and disposal of debris;
  - .8 The collection of demolition materials, their disposal off-site and their treatment in accordance with the provisions of Section 01 74 19 - *Waste Management and Disposal*;
  - .9 The preparation, presentation and correction of the Work Plan and Shop Drawings of the new deck joint with an elastomer seal and gutter, including the slip relating to the installation of steel bars and anchor as well as the concreting procedure, the descriptive sheets of the mixtures and the required technical data sheets;
  - .10 Mobilization of labor, tools and equipment required to complete the work of the new deck joint;
  - .11 The supply, handling, transportation and installation of the new deck gasket, including field welds and their control;
  - .12 Rebar supply and shaping, galvanizing when specified in drawings and specifications, rebar installation confirmation table, and installation slip review. the cuts and adjustments in the building site, the laying of reinforcing steel required;
  - .13 Supply, handling, transportation and placement of steel anchor rods and chemical anchor; drilling and cleaning holes for the installation of chemical anchors; performing control anchor tests in accordance with Section 03 30 03 - *Concrete Repairs*; the rebar installation confirmation table and a revision of the installation slip;
  - .14 Supply, installation and dismantling of formwork;
  - .15 Supply, installation, vibration, finishing, wet curing of concrete, finishing of concrete, tests and registers;
  - .16 Treatment of surplus materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .17 Deck joint leak test;
  - .18 Incidental expenses and coordination.



- .2 Items 3.2.2 and 3.2.3 Replacement of Deck Joint Seal at Pier and at North Abutment
  - .1 The price at payment items 3.2.2 and 3.2.3 of the Bid Form is a per linear meter price (m. lin.) for the replacement of deck joint seal at the central pier and North abutment of the bridge, in accordance with the requirements of the drawings and specifications.
  - .2 The deck joints of a supplier must be approved by the government representative.
  - .3 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the removal of the seal seal and the required data sheets;
    - .2 The mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Removal, storage and reinstallation of bolts and joint cover plate;
    - .4 Supply, handling, transportation and placement of new deck joint seal seal;
    - .5 In the event of damage, immediately restore the affected items and at the expense of the Contractor;
    - .6 Deck joint leak test;
    - .7 Incidental expenses and coordination

### 3.3 Item 3.3 - Replacement of Rolling Surface - Span 1

- .1 Item 3.3.1 Removal of Bituminous Pavement
  - .1 .1 The price at payment item 3.3.1 of the Bid Form is the price per square meter (m<sup>2</sup>) of bituminous mix removed and disposed off the job site in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for asphalt removal work, including the description of the equipment used for the stripping;
    - .2 The saw cuts required to delineate the area of removal of bituminous mix;
    - .3 Bituminous mix removal;
    - .4 Cleaning after removal;
    - .5 Collection of cleaning materials and their treatment as specified in Section 01 74 19 - *Waste Management and Disposal*;
    - .6 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .7 Incidental expenses and coordination.
- .2 Item 3.3.2 Surface Repairs of Slab (<100 mm)
  - .1 The price at payment item 3.3.2 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for surface repairs to the slab, in accordance with the requirements of the drawings and specifications as well as directed by the Government Representative.

- .2 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction of the Work Plan for the surface repair of the slab;
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 Preparation, presentation and correction of the Demolition Work Plan;
  - .4 Saw cuts required;
  - .5 The demolition of unsound concrete to sound concrete as per the drawings and instructions of the Departmental Representative;
  - .6 The protection of the reinforcement to be preserved;
  - .7 The collection of demolition materials, their disposal off site and their treatment in accordance with the provisions of section 01 74 19 - *Waste Management and Disposal*;
  - .8 Supply, shaping, handling, transportation and installation of reinforcement if required;
  - .9 Preparation, presentation and correction of Work Plan for shop drawings, concreting procedure, specification sheets of blends and data sheets required;
  - .10 The treatment of the substrate before concreting;
  - .11 Supply, installation, vibration, finishing, wet cure of type V-S concrete with coarse aggregates 5-14 mm;
  - .12 The cleaning of surfaces adjacent to the concreting area;
  - .13 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
  - .14 Concrete finishing, tests and records;
  - .15 The treatment of surplus materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
  - .16 Incidental expenses and coordination.
- .3 Item 3.3.3 Deep Repairs of Slab (> 100 mm)
  - .1 The price at payment item 3.3.3 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for the repair work at depth of the slab, including the first 100 mm, in accordance with requirements of drawings and specifications and as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the surface repair of the slab;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Preparation, presentation and correction of the Demolition Work Plan;
    - .4 Saw cuts required;

- .5 The demolition of unsound concrete to sound concrete as well as to the indications in the drawings and the instructions of the Government Representative;
  - .6 The protection of the reinforcement to be preserved;
  - .7 The collection of demolition materials, their disposal off site and their treatment in accordance with the provisions of section 01 74 19 - *Waste Management and Disposal*;
  - .8 Supply, shaping, handling, transportation and installation of reinforcement if required;
  - .9 Preparation, presentation and correction of Work Plan for shop drawings, concreting procedure, specification sheets of blends and data sheets required;
  - .10 The treatment of the substrate before concreting;
  - .11 Supply, installation and dismantling of formwork;
  - .12 The supply, the implementation, the vibration, the finish, the wet cure of concrete type V-S with coarse aggregate 5-14 mm;
  - .13 Cleaning of surfaces adjacent to the concrete zone;
  - .14 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
  - .15 Concrete finishing, tests and records;
  - .16 The treatment of surplus materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
  - .17 Incidental expenses and coordination.
- .4 Item 3.3.4 Installation of a Rolling Screed
- .1 The price at Payment Item 3.3.4 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for the construction of a concrete screed on the deck slab, in accordance with the requirements of drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the construction of a concrete screed and the specifications of the concrete mix;
    - .2 The mobilization of labor, tools and equipment required for carrying out the work in accordance with the drawings and specifications;
    - .3 Cleaning the surface to be covered;
    - .4 Installation and removal of formwork, if required;
    - .5 Saw cuts required;
    - .6 Substrate treatment prior to concreting, including hydrodemolition, cleaning and application of adhesion grout;
    - .7 Supply, implementation, vibration, finishing, wet curing of type XVI-15 concrete;
    - .8 Carry out the transverse grooving;

- .9 Protection of concrete screed;
- .10 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*.
- .11 Incidental expenses and coordination.

### 3.4 Item 3.4 - Replacement of Rolling Surface - South Approach

- .1 Item 3.4.1 Removal of Bituminous Pavement
  - .1 The price at payment item 3.4.1 of the Bid Form is the price per square meter (m<sup>2</sup>) of bituminous mix removed and disposed off the job site in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for asphalt removal work, including the description of the equipment used for the stripping;
    - .2 The saw cuts required to delineate the area of removal of bituminous mix;
    - .3 Bituminous mix removal;
    - .4 Cleaning after removal;
    - .5 Collection of cleaning materials and their treatment as specified in Section 01 74 19 - *Waste Management and Disposal*;
    - .6 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .7 Incidental expenses and coordination.
- .2 Item 3.4.2 Removal of Galvanized W-Beam Guide Rail
  - .1 The price at payment item 3.4.2 of the Bid Form is a per linear meter price (lin. m.) for the removal and disposal of galvanized W-Beam guide rail at the South approach, including the connecting parts as well as all related items, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The mobilization of labor, tools and equipment and hardware required for the execution of the work;
    - .2 Disposal of materials in accordance with Section 07 74 19 - *Waste Management and Disposal*.
    - .3 Incidental expenses and coordination.
- .3 Item 3.4.3 Demolition of Curb at Southeast Approach
  - .1 The price at payment item 3.4.3 of the Bid Form is a linear meter price (lin. m.) for the removal and disposal of Southeast approach concrete curbs, including the steel cover plate, in accordance with the following: specifications and drawings and as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:

- .1 Preparation, presentation and correction, if required, of the Demolition Work Plan;
  - .2 Saw cuts required;
  - .3 Cleaning after demolition;
  - .4 Collection and treatment of demolition and cleaning materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .5 Any incidental expenses.
- .4 Item 3.4.4 Surface Repairs of Tunnel Slab (<100 mm)
- .1 The price at payment item 3.4.4 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for surface repairs to the slab, in accordance with the requirements of the drawings and specifications as well as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the surface repair of the slab;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Preparation, presentation and correction of the Demolition Work Plan;
    - .4 Saw cuts required;
    - .5 The demolition of unsound concrete to sound concrete as per the drawings and instructions of the Government Representative;
    - .6 The protection of the reinforcement to be preserved;
    - .7 The collection of demolition materials, their disposal off site and their treatment in accordance with the provisions of section 01 74 19 - *Waste Management and Disposal*;
    - .8 Supply, shaping, handling, transportation and installation of reinforcement if required;
    - .9 Preparation, presentation and correction of Work Plan for shop drawings, concreting procedure, specification sheets of blends and data sheets required;
    - .10 The treatment of the substrate before concreting;
    - .11 Supply, installation, vibration, finishing, wet cure of type V-S concrete with coarse aggregates 5-14 mm;
    - .12 The cleaning of surfaces adjacent to the concreting area;
    - .13 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
    - .14 Concrete finishing, tests and records;
    - .15 The treatment of surplus materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
    - .16 Incidental expenses and coordination.

- .5 Item 3.4.5 Deep Repairs of Tunnel Slab (>100 mm)
- .1 The price at payment item 3.4.5 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for the repair work at depth of the slab, including the first 100 mm, in accordance with requirements of drawings and specifications and as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the surface repair of the slab;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Preparation, presentation and correction of the Demolition Work Plan;
    - .4 Saw cuts required;
    - .5 The demolition of unsound concrete to sound concrete as well as to the indications in the drawings and the instructions of the Government Representative;
    - .6 The protection of the reinforcement to be preserved;
    - .7 The collection of demolition materials, their disposal off site and their treatment in accordance with the provisions of section 01 74 19 - *Waste Management and Disposal*;
    - .8 Supply, shaping, handling, transportation and installation of reinforcement if required;
    - .9 Preparation, presentation and correction of Work Plan for shop drawings, concreting procedure, specification sheets of blends and data sheets required;
    - .10 The treatment of the substrate before concreting;
    - .11 Supply, installation and dismantling of formwork;
    - .12 The supply, the implementation, the vibration, the finish, the wet cure of concrete type V-S with coarse aggregate 5-14 mm;
    - .13 Cleaning of surfaces adjacent to the concrete zone;
    - .14 At the end of the work, the off-site removal of the materials forming the formwork and the correction of the faulty repairs;
    - .15 Concrete finishing, tests and records;
    - .16 The treatment of surplus materials in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
    - .17 Incidental expenses and coordination.
- .6 Item 3.4.6 Reconstruction of Curb at Southeast Approach
- .1 The price at payment item 3.4.6 of the Bid Form is a linear meter price (lin. m.) for the rebuilding of the South East approach curb, in accordance with specifications and drawings as well as with the instructions of the Government representative.
  - .2 The price includes the following, but is not limited to:

- .1 Preparation, presentation and correction, if required, of shop drawings and reinforcement slip;
  - .2 The preparation, presentation and correction, if required, of the Work Plan and specification sheets of the concrete mix;
  - .3 Mobilization of labor, tools and equipment required for the execution of the work;
  - .4 Supply, installation and dismantling of required forms;
  - .5 Substrate treatment before concreting;
  - .6 Supply, shaping, handling, transportation and installation of reinforcement;
  - .7 Supply and installation of steel ligature wire;
  - .8 At the end of the work, the off-site evacuation of the materials forming the formwork;
  - .9 Supply, implementation, vibration, finishing, wet curing of concrete;
  - .10 Supply, implementation and compaction of granular foundation material, as indicated in specifications and drawings;
  - .11 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*;
  - .12 Any incidental expenses.
- .7 Item 3.4.7 Supply and Installation of New Galvanized W-Beam Guide Rail
- .1 The price at payment item 3.4.7 of the Bid Form is a price per linear meter (lin. m.) for the supply and installation of new galvanized W-Beam guide rail at the South Approach, in accordance with the requirements of drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of shop drawings for double corrugated steel sections, including assembly elements;
    - .2 Supply and transportation of all required materials;
    - .3 Mobilization of labor, tools and equipment required for the execution of the work;
    - .4 Implementation of galvanized W-Beam guide rail at the South approach;
    - .5 The cleaning of the premises at the end of the work;
    - .6 Treatment of materials resulting from cleaning in accordance with the requirements of Section 01 74 19 - *Waste Management and Disposal*;
    - .7 Incidental expenses and coordination.
- .8 Item 3.4.8 Replacement of Steel Guardrail at Southeast Approach
- .1 The price at payment item 3.4.8 of the Bid Form is a price per meter of the barrier replaced which covers all the costs for the replacement work of the steel guardrail at the Southeast approach, in accordance with specifications and drawings as well as according to the instructions of the Government Representative.



- .2 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction, if required, of the shop drawings and the Work Plan for the repair of the steel slide;
  - .2 The supply, shaping, cleaning and painting in the workshop of the steel elements of the slide;
  - .3 Handling, transportation and storage of steel components on site;
  - .4 The mobilization of labor, tools and equipment required for the execution of the work;
  - .5 Measurement, marking and drilling holes in existing chords if required;
  - .6 Supply of bolts and washers required for bolting;
  - .7 Installation and bolting of new steel slider elements;
  - .8 Painting retouching;
  - .9 Any incidental expenses.
- .9 Item 3.4.9 Installation of a Rolling Screed
  - .1 The price at Payment Item 3.4.9 of the Bid Form is a price per square meter (m<sup>2</sup>) which covers all costs for the construction of a concrete screed on the tunnel slab, in accordance with the requirements of drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the construction of a concrete screed and the specifications of the concrete mix;
    - .2 The mobilization of labor, tools and equipment required for carrying out the work in accordance with the drawings and specifications;
    - .3 Saw cuts required;
    - .4 Substrate treatment prior to concreting, including hydrodemolition, cleaning and application of adhesion grout;
    - .5 Supply, implementation, vibration, finishing, wet curing of type XVI-15 concrete;
    - .6 Carry out the transverse grooving;
    - .7 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*;
    - .8 Incidental expenses and coordination.
- .10 Item 3.4.10 Placement of Bituminous Mix
  - .1 The price at payment item 3.4.10 of the Bid Form is a price per square meter (m<sup>2</sup>) of bituminous mix placed at the approach, in accordance with the requirements of the drawings and specifications.
  - .2 The installation of the asphalt is carried out within a maximum of three (3) days after the installation of the waterproofing membrane. The days where the weather conditions are unfavorable in the sense of the requirements of implementation of



the prepared mix and put in heat are excluded from the calculation of this time of execution.

- .3 All traffic is prohibited on the newly installed asphalt until the surface temperature of the asphalt is below 85 ° C.
- .4 The price includes the following, but is not limited to:
  - .1 Mobilization of labor, tools and equipment required for the execution of the work;
  - .2 The supply and transportation of all materials required for the manufacture of asphalt;
  - .3 The supply, loading, transportation and application of the bonding binder;
  - .4 The supply, loading, transportation, implementation and compaction of bituminous mix;
  - .5 The implementation of the pavement joint with the existing;
  - .6 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*;
  - .7 The cleaning of the premises at the end of the work;
  - .8 Treatment of materials resulting from cleaning in accordance with Section 01 74 19 - *Waste Management and Disposal*;
  - .9 Incidental expenses and coordination.

### 3.5 Item 3.5 - Work on Counterweight Structure

- .1 Item 3.5.1 Removal of Loose Concrete from Surfaces
  - .1 The price at payment item 3.5.1 of the Bid Form is a per square meter (m<sup>2</sup>) price of loose concrete demolished on the counterweight surface in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the demolition of loose concrete on counterweight surfaces;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 The demolition of loose concrete surfaces;
    - .4 Collection and treatment of demolition materials in accordance with Section 01 74 19 - *Waste Management and Disposal*;
    - .5 Incidental expenses and coordination.
- .2 Item 3.5.2 Counterweight Concrete Waterproofing
  - .1 The price at payment item 3.5.2 of the Bid Form is a price per square meter (m<sup>2</sup>) of waterproofed area, to offset all costs of cleaning and waterproofing the concrete surfaces of the counterweight, in accordance with the requirements of the drawings and specifications.

- .2 The treated surfaces must be protected from rain and splashing for a period of six (6) hours following the application of the waterproofing.
- .3 The price includes the following, but is not limited to:
  - .1 The preparation, presentation and correction of the work plan and data sheets of the waterproofing product;
  - .2 Mobilization of labor, tools and equipment required for the execution of the work;
  - .3 The cleaning of concrete surfaces according to the method approved by the Government Representative;
  - .4 The recovery and disposal of the residues of the cleaning operation to a site in compliance with the applicable regulations;
  - .5 The application of the waterproofing agent to the concrete surfaces of the counterweight system, in the field, when the cleaning is completed to the satisfaction of the Government Representative;
  - .6 The cleaning of the premises at the end of the work;
  - .7 Incidental expenses and coordination.
- .3 Item 3.5.3 – Without Oversize Concrete Repair of Counterweight
  - .1 The price at payment item 3.5.3 of the Bid Form is a price per square meter (m<sup>2</sup>) of repaired concrete surface, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the Work Plan for the partial demolition of counterweight concrete;
    - .2 The mobilization of labor, tools and equipment required for the execution of the work;
    - .3 Saw cuts required;
    - .4 Demolition of unsound concrete to healthy concrete as per the indications on the drawings and the directives of the Government Representative;
    - .5 Protection of the reinforcement to be preserved;
    - .6 Collection of demolition materials, their disposal off site and their treatment according to the prescriptions of section 01 74 19 - *Waste Management and Disposal*;
    - .7 The preparation, presentation and correction of shop drawings and the list of welded reinforcements;
    - .8 Supply, installation and dismantling of required formwork;
    - .9 Supply and installation of formwork tie rods;
    - .10 Supply and application of formwork release agent;
    - .11 Supply and installation of steel ligature wire;
    - .12 Drilling and cleaning of holes for the installation of chemical anchors;

- .13 The supply, handling, transportation and placement of the chemical anchor;
  - .14 The supply, shaping, handling, transportation and installation of steel anchor rods;
  - .15 The preparation, presentation and correction of the Work Plan concerning the shop drawings, the concreting procedure, description sheets of the mix and technical sheets required;
  - .16 Substrate treatment before concreting;
  - .17 Supply, installation, vibration, finishing, wet curing of type XIV-R or XIV-C concrete;
  - .18 The cleaning of concrete surfaces adjacent to the concreting area;
  - .19 The supply and application of repair mortar at formwork tie rods;
  - .20 At the end of the work, the off-site disposal of the materials making up the formwork and the correction of defective repairs;
  - .21 Concrete finishing, tests and registers;
  - .22 Treatment of surplus materials in accordance with Section 07 74 19 - *Waste Management and Disposal*.
  - .23 Incidental expenses and coordination.
- .4 Item 3.5.4 - Galvanized Welded Wire Mesh 51x51 MW9,1xMW9,1
- .1 The price at payment item 3.5.4 of the Bid Form is a price per square meter (m<sup>2</sup>) of mesh, in accordance with the requirements of the drawings and specifications.
  - .2 The price includes the following, but not limited to:
    - .1 Preparation, presentation and correction of the Work Plan, shop drawings concerning the installation of the mesh;
    - .2 Mobilization of the workforce, tools and equipment required to carry out the work;
    - .3 The supply of the mesh in the form of flat sheets only as well as the shaping of these in accordance with section 03 20 00 – *Concrete Reinforcing*;
    - .4 Installation of the mesh including the required overlaps;
    - .5 Steel wire used to tie the mesh;
    - .6 Incidental expenses and coordination.

**3.6 Item 3.6 - Manhole to be Cleaned**

- .1 The price at payment item 3.6 of the Bid Form is a lump sum overall price to compensate for all the costs incurred for cleaning the manhole, in accordance with the drawings and specifications.
- .2 The price includes the following, but not limited to:
  - .1 Preparation, presentation and correction of the Work Plan;
  - .2 Mobilization of labor, tools and equipment required for the completion of the work;

- .3 Manhole cleaning according to the method approved by the Government Representative;
- .4 The recovery and evacuation of residues from the cleaning operation to a site in accordance with the regulations in force;
- .5 Manhole cleaning until the Government Representative is satisfied;
- .6 Cleaning of the premises at the end of the work;
- .7 Incidental expenses and coordination.

**Part 4 Item 4 - IV - WINTER CONDITIONS**

**4.1 Item 4.1 - Cold Weather Concreting**

- .1 Item 4.1.1 - Temporary Shelter and Heating Included for Concrete Work
  - .1 The price at payment item 4.1.1 of the Bid Form is a price per square meter (m<sup>2</sup>) related to the protection and heating of new concrete during concreting in cold weather to offset all costs incurred for the temporary shelter for all pre-concreting work and all concrete work, in accordance with the requirements of drawings and specifications.
  - .2 Temporary shelter is payable only if required in writing by the Government Representative.
  - .3 The price includes the following, but is not limited to:
    - .1 Preparation, presentation and correction, shop drawings and description of the shelter;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 The supply, handling and transportation of materials required to build the shelter;
    - .4 Installation, maintenance during the work and dismantling at the end of the work of the temporary shelter;
    - .5 The heating of the temporary shelter during the execution of the works;
    - .6 Off-site transportation of materials;
    - .7 Incidental expenses and coordination.
  - .4 Protection after the cure period:
    - .1 The heating of cast-in place concrete after the curing period is at the Contractor's expense.
    - .2 Concrete heating in place after this additional period, necessary to complete the protection period following grouting, is at the Contractor's expense.
  - .5 The bid price is paid as follows:

- .1 A sum corresponding to 60% of the amount after installation of the shelter to the satisfaction of the Government Representative;
  - .2 A sum corresponding to 40% of the amount after the evacuation of the materials that made up the shelter, outside the site to the satisfaction of the Government Representative.
- .2 Item 4.1.2 - Insulation (RSI 0.40 per layer)
- .1 The price at payment item 4.1.2 of the Bid Form is a per square meter (m<sup>2</sup>) price of new uncovered concrete surface covered with insulation, in accordance with the requirements of the drawings and specifications.
  - .2 The costs related to the concrete insulation protection required as a result of the correction of defective work are the responsibility of the Contractor.
  - .3 Insulation layers are payable only if required in writing by the Government Representative.
  - .4 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction of the description of the composition of the insulation layer;
    - .2 Mobilization of labor, tools and equipment required for the execution of the work;
    - .3 The supply, handling, transportation, installation, maintenance during the works and the evacuation at the end of the work of the insulation layers;
    - .4 Incidental expenses and coordination.
  - .5 The bid price is paid as follows:
    - .1 A sum corresponding to 60% of the amount after installation of the insulation layers requested to the satisfaction of the Government Representative;
    - .2 A sum corresponding to 40% of the amount after the evacuation of insulating materials, off site to the satisfaction of the Government Representative.
- .3 Item 4.1.3 - Heating of Concrete Constituents or Masonry Mortar
- .1 The price at payment item 4.1.3 of the Bid Form is a per cubic meter (m<sup>3</sup>) price of concrete or cementitious grout set up whose constituents are heated in accordance with the requirements of the drawings and specifications.
  - .2 The costs of heating concrete components or non-shrink grout required as a result of the correction of defective work are the responsibility of the contractor.
  - .3 The price includes the following, but is not limited to:
    - .1 Heating the mixing water (between 40 ° C and 80 ° C) used for the manufacture of concrete;
    - .2 Heating aggregates to remove frozen pieces, snow and ice;
    - .3 Incidental expenses and coordination.
- .4 Item 4.1.4 - Additional Heating

- .1 The price at payment item 4.1.4 of the Submission tender is a cost per additional day of heating.
- .2 The additional heating of the temporary shelter is payable only if it is required in writing by the Government Representative.
- .3 The cost is used for heating because these works are of such nature that the costs can not be estimated exactly.
- .4 At the end of each day, the Government Representative and the Contractor compare their respective records of the time payable and the materials used to agree on a single document, which is signed in two (2) copies by each Parties. One copy goes to the Government Representative and the other to the Contractor.
- .5 All statements of accounts of the Contractor must be detailed and accompanied by the required supporting documents. The Contractor must allow any authorized representative of the Government to inspect his books, pay slips, cost prices and any other document used as a basis for the preparation of his statements.
- .6 When the "cost " method is applied, the work is done under controlled manner, and the calculation of the payments to be made corresponds to the actual costs of the Contractor and its subcontractors and must include taxes and other duties imposed by any competent authority on labor, materials, heavy machinery, miscellaneous equipment, small tools and other equipment required and to which the Contractor is subject, excluding goods and services tax (GST) and the Quebec Sales Tax (QST).
- .7 The calculation of payments to be made is based on the following data and must include any other cost of labor, materials, heavy machinery, small tools and any other required, unspecified equipment attributable to changes in the conditions of execution or the execution of unforeseen work.
- .8 Costs
  - .1 Labor Costs
    - .1 The cost of labor consists of:
      - .1 Salaries paid to the worker as well as to the foreman and, where applicable, to the Superintendent who supervises the employees on the work site, in accordance with the Collective Agreement or Decree of the Civil and Road Workers, plus the employee benefits. applicable to wages;
      - .2 Additional travel and accommodation costs for additional employees required;
      - .3 No direct payment is made to the Contractor's employees who generally work at headquarters, at a general office, at the site office, in a garage or warehouse;
      - .4 Excludes overheads, administration fees and profits.
    - .2 Material costs
      - .1 The cost of materials consists of the cost of all materials, products, supplies, in addition to the cost of transportation, storage and handling thereof, all

- corresponding to the lowest price awarded to the Contractor and subcontractors.
- .2 Energy and heating costs are part of the materials of this Contract;
  - .3 Excludes overheads, administration fees and profits.
  - .3 Cost of equipment, heating equipment, small tools and other equipment. The cost of various equipment, heating equipment, small tools and other equipment consists of:
    - .1 Cost of transportation and assembly when miscellaneous equipment, heating equipment, small tools and other required equipment are not already on site. The time spent on the repair is not payable.
    - .2 Cost of use miscellaneous equipment, heating equipment, small tools and other equipment calculated using the following rates:
      - .1 The internal rental rate, excluding administration and profits, when the equipment belongs to the Contractor;
      - .2 The internal rental rate, excluding administration and profits, when the equipment belongs to a subcontractor;
      - .3 The rate charged when the equipment belongs to the supplier.
    - .3 The internal rental rate and the invoiced rate are subject to verification and must be approved by the Government Representative.
    - .4 Equipment and small tools such as hammers, pliers and others are not payable.
    - .5 Equipment, heating equipment, small tools and other equipment must be in a state of operation as original.
    - .6 Excludes overheads, administration fees and profits.

#### 4.2 **Item 4.2 - Cold Weather Painting**

- .1 Item 4.2.1 - Heating of Containment Enclosure
  - .1 The price at payment item 4.2.1 of the Bid Form is a cost price per heating day.
  - .2 The heating of the containment is payable only if it is required in writing by the Government Representative.
  - .3 The cost is used for heating because these works are of such nature that the costs cannot be estimated exactly.
  - .4 At the end of each day, the Government Representative and the Contractor compare their respective records of the time payable and the materials used to

- agree on a single document, which is signed in two (2) copies by each Parties. One copy goes to the Government Representative and the other to the Contractor.
- .5 All statements of accounts of the Contractor must be detailed and accompanied by the required supporting documents. The Contractor must allow any authorized representative of the Government to inspect his books, pay slips, cost prices and any other document used as a basis for the preparation of his statements.
- .6 When the "cost " method is applied, the work is done under controlled manner, and the calculation of the payments to be made corresponds to the actual costs of the Contractor and its subcontractors and must include taxes and other duties imposed by any competent authority on labor, materials, heavy machinery, miscellaneous equipment, small tools and other equipment required and to which the Contractor is subject, excluding goods and services tax (GST) and the Quebec Sales Tax (QST).
- .7 The calculation of payments to be made is based on the following data and must include any other cost of labor, materials, heavy machinery, small tools and any other required, unspecified equipment attributable to changes in the conditions of execution or the execution of unforeseen work.
- .8 Costs
- .1 Labor Costs
- .1 The cost of labor consists of:
- .1 Salaries paid to the worker as well as to the foreman and, where applicable, to the Superintendent who supervises the employees on the work site, in accordance with the Collective Agreement or Decree of the Civil and Road Workers, plus the employee benefits. applicable to wages;
- .2 Additional travel and accommodation costs for additional employees required;
- .3 No direct payment is made to the Contractor's employees who generally work at headquarters, at a general office, at the site office, in a garage or warehouse;
- .4 Excludes overheads, administration fees and profits.
- .2 Material costs
- .1 The cost of materials consists of the cost of all materials, products, supplies, in addition to the cost of transportation, storage and handling thereof, all corresponding to the lowest price awarded to the Contractor and subcontractors.
- .2 Energy and heating costs are part of the materials of this Contract;
- .3 Excludes overheads, administration fees and profits.
- .3 Cost of equipment, heating equipment, small tools and other equipment. The cost of various equipment, heating equipment, small tools and other equipment consists of:



- .1 Cost of transportation and assembly when miscellaneous equipment, heating equipment, small tools and other required equipment are not already on site. The time spent on the repair is not payable.
- .2 Cost of use miscellaneous equipment, heating equipment, small tools and other equipment calculated using the following rates:
  - .1 The internal rental rate, excluding administration and profits, when the equipment belongs to the Contractor;
  - .2 The internal rental rate, excluding administration and profits, when the equipment belongs to a subcontractor;
  - .3 The rate charged when the equipment belongs to the supplier.
- .3 The internal rental rate and the invoiced rate are subject to verification and must be approved by the Government Representative.
- .4 Equipment and small tools such as hammers, pliers and others are not payable.
- .5 Equipment, heating equipment, small tools and other equipment must be in a state of operation as original.
- .6 Excludes overheads, administration fees and profits.

**Part 5**

**Item 5 - V – TRAFFIC MAINTENANCE AND TEMPORARY SIGNAGE**

- .1 Items 5.1 to 5.4 - Partial Closure of Lafleur Bridge (one lane out of two) – Short Term (item 5.1), Partial Closure of Gauron Bridge (one lane out of two) – Short Term (item 5.2), Complete Closure of Lafleur Bridge – Short Term (item 5.3), Complete Closure of Gauron Bridge – Short Term (item 5.4)
  - .1 Prices at payment items 5.1 to 5.4, of the Bid Form are unit prices (day or night, depending on closure) for the maintenance of traffic and temporary signage, in accordance with requirements and drawings as well as according to the specifications. directives of the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 Maintenance of traffic and temporary signage;
    - .2 Preparation of all signaling drawings;
    - .3 Preparation of closing requests;
    - .4 Provision of all signaling personnel, including signaling and site manager, and machinery and vehicles required for temporary signage;
    - .5 The mobilization of access to work areas, their maintenance and dismantling;

- .6 Maintenance of access to properties;
  - .7 The maintenance of the closure when it is of long duration;
  - .8 The supply of a signaling manager;
  - .9 Supply, mobilization, maintenance, servicing, replacement in the event of breakage or vandalism, activation or deactivation, relocation and demobilization of temporary signage required to perform work on the entire site in accordance with the requirements of this document;
  - .10 Maintenance of signs and circulation lanes including requested inspections;
  - .11 Temporary signage, equipment and labor required for the complete performance of all work;
  - .12 Signage for cyclists and pedestrians;
  - .13 Modification and refurbishment of existing signage;
  - .14 As well as other charges relating to the special requirements for the maintenance of traffic, as defined in the articles of section 01353-4;
  - .15 Any incidental expenses.
- .2 Items 5.5 to 5.6 - Maintaining Partial Closure of Lafleur Bridge (one lane out of two) – Long Term (item 5.5), Maintaining Partial Closure of Gauron Bridge (one lane out of two) – Short Term (item 5.6)
- .1 Prices at payment items 5.5 to 5.6, of the Bid Form are unit prices (day or night, depending on closure) for the maintenance of traffic and temporary signage, in accordance with requirements and drawings as well as according to the specifications. directives of the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 Maintenance of traffic and temporary signage;
    - .2 Preparation of all signaling drawings;
    - .3 Preparation of closing requests;
    - .4 Provision of all signaling personnel, including signaling and site manager, and machinery and vehicles required for temporary signage;
    - .5 The mobilization of access to work areas, their maintenance and dismantling;
    - .6 Maintenance of access to properties;
    - .7 The maintenance of the closure when it is of long duration;
    - .8 The supply of a signaling manager;
    - .9 Supply, mobilization, maintenance, servicing, replacement in the event of breakage or vandalism, activation or deactivation, relocation and demobilization of temporary signage required to perform work on the entire site in accordance with the requirements of this document;
    - .10 Maintenance of signs and circulation lanes including requested inspections;

- .11 Temporary signage, equipment and labor required for the complete performance of all work;
  - .12 Signage for cyclists and pedestrians;
  - .13 Modification and refurbishment of existing signage;
  - .14 As well as other charges relating to the special requirements for the maintenance of traffic, as defined in the articles of section 01353-4;
  - .15 Any incidental expenses.
- .3 Items 5.7 to 5.8 - Complete Weekend Closure of the Gauron Bridge - Contra-Flow Circulation on Lafleur Bridge (item 5.7) and Complete Weekend Closure of Lafleur Bridge - Contra-Flow Circulation on Gauron Bridge (item 5.8)
- .1 Prices at payment Items 5.5 and 5.6 of the Bid Form are a unit price for the weekend work for maintenance of traffic and temporary signage in accordance with specifications and drawings and as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 Maintenance of traffic and temporary signage for a weekend, from Friday evening to Monday morning;
    - .2 Preparation of all signaling drawings;
    - .3 Preparation of closing requests;
    - .4 Provision of all signaling personnel, including signaling and site manager, and machinery and vehicles required for temporary signage;
    - .5 The mobilization of access to work areas, their maintenance and dismantling;
    - .6 Maintenance of access to properties;
    - .7 Supply of five (5) flagmen or a sufficient number of flagmen to manage traffic at the intersection of Dollard Avenue and St-Patrick Street;
    - .8 The closure of the right-hand lanes from Dollard Avenue in a northerly direction to the south approach of the intersection of Dollard Avenue and St. Patrick Street.
    - .9 Maintain closure throughout the weekend;
    - .10 Supply, mobilization, maintenance, servicing, replacement in the event of breakage or vandalism, activation or deactivation, relocation and demobilization of temporary signage necessary for the execution of work on the entire site in accordance with the requirements of this document;
    - .11 Maintenance of signage and circulation lanes including requested inspections;
    - .12 Temporary signage, equipment and labor required for the complete performance of all work;
    - .13 Signage for cyclists and pedestrians;
    - .14 Modification and refurbishment of existing signage;

- .15 As well as other charges relating to the special requirements for the maintenance of traffic, as defined in the articles of section 01353-4;
- .16 Any incidental expenses.
- .4 Items 5.9 to 5.11 – Supply of Front-End Restraint System (impact attenuator) TL-2 Type (item 5.9), Displacement of Front-End Impact Restraint System (impact attenuator) TL-2 Type (item 5.10), Maintenance of Front-End Restraint System (impact attenuator) TL-2 Type (item 5.11)
  - .1 The price at the payment item 5.9 of the Bid Form is a unit price (unit-day) for the supply front-end restraint system (impact attenuator) TL-2 type as specified in the specifications and drawings as well as according to the instructions of the Government Representative.
  - .2 The price at the payment item 5.10 of the Bid Form is a unit price for the displacement of the front-end restraint system (impact attenuator) TL-2 type in accordance with specifications and drawings as well as in accordance with the instructions. of the Government Representative.
  - .3 The price at payment item 5.11 of the Bid Form is a unit price per day for the maintenance of the front-end restraint system (impact attenuator) TL-2 type in accordance with specifications and drawings as well as the instructions of the Government Representative.
  - .4 The price includes the following, but is not limited to:
    - .1 The provision of the front-end restraint system;
    - .2 Mobilization of the front-end restraint system;
    - .3 Maintaining the front-end restraint system;
    - .4 Refurbishment in the event of breakage or vandalism of the front-end restraint system;
    - .5 The application of a chevron beacon or danger on the front-end restraint system;
    - .6 Displacement of the front-end restraint system during phase change;
    - .7 Demobilization of the front-end restraint system;
    - .8 Temporary signage required during these operations.
    - .9 Written certification by an engineer member of the Ordre des ingénieurs du Québec that the construction front-end restraint system is installed in compliance with and according to the manufacturer's requirements.
  - .5 Front-end restraint system that may be required by the contractor for site access are at the Contractor's expense and are included in payment items 5.1 to 5.6.
- .5 Item 5.12 – Replacement of a Front-End Restraint System (impact attenuator) TL-2 Type for Work Site
  - .1 The price at payment item 5.12 of the Bid Form is a unit price for the Replacement of Front-End restraint System (impact attenuator) TL-2 type, in accordance with specifications and drawings and as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:

- .1 Supply of all materials, labor and incidental expenses
  - .2 Temporary signage for full and correct replacement of the front-end restraint system.
  - .3 Written certification by an engineer member of the Ordre des ingénieurs du Québec that the front-end restraint system is installed in accordance with the manufacturer's requirements.
  - .4 This item is payable to the Contractor only when no full police report for the accident is available.
- .6 Items 5.13 to 5.15 – Rental of Concrete Traffic Barriers for Construction Site (item 5.13), Displacement of Concrete traffic Barriers for Construction Site (item 5.14), Maintenance of Concrete Traffic Barriers for Construction Sites (item 5.15)
- .1 The price at payment item 5.13 of the Bid Form is a price per linear meter (lin. m.) for the supply of concrete traffic barriers for construction on site, in accordance with specifications and drawings and as directed by the Government Representative.
  - .2 The price at payment item 5.14 of the Bid Form is a price per linear meter (lin. m.) for the movement of concrete traffic barriers for construction site, in accordance with specifications and drawings and as directed by the Government Representative.
  - .3 The price at the payment item 5.15 of the Bid Form is a price per linear meter (lin. m.) per day for the maintenance of concrete traffic barriers for construction site, in accordance with specifications and drawings and as directed by the Government Representative.
  - .4 The price includes the following, but is not limited to:
    - .1 Mobilization of required concrete traffic barriers;
    - .2 Their maintenance for the duration of the work;
    - .3 Replacement of concrete traffic barriers in case of breakage or vandalism;
    - .4 The displacement of concrete traffic barriers during a change of closure;
    - .5 The demobilization of concrete traffic barriers at the end of the work;
    - .6 Temporary signage to perform all these operations;
    - .7 Any incidental expenses.
  - .5 The price tendered for item 5.13 also covers:
    - .1 Loading concrete traffic barriers;
    - .2 Transportation within the limits of the work site or at a storage site determined by the Contractor;
    - .3 Unloading concrete traffic barriers;
    - .4 Installation of concrete traffic barriers;
    - .5 Replacement or repair of deteriorate concrete traffic barriers.

- .6 Movement of concrete traffic barriers for purposes other than traffic management shall be at the expense of the Contractor.
- .7 The price quoted at item 5.14 is paid as follows:
  - .1 A sum corresponding to 60% of the amount after the initial mobilization of concrete site barriers;
  - .2 A sum corresponding to 40% of the amount after the final demobilization of concrete site barriers.
- .7 Item 5.16 - Special Signs
  - .1 The price at payment item 5.16 of the Bid Form is a per square meter (m<sup>2</sup>) price for special signs conforming and installed, in accordance with specifications and drawings and as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 The preparation, presentation and correction, if necessary, of shop drawings signed and sealed by a member engineer in good standing of the Ordre des ingénieurs du Québec;
    - .2 Obtaining all required certifications;
    - .3 The supply, shaping, transportation and handling of materials required for the implementation of special panels;
    - .4 The mobilization of labor, tools and equipment required for the execution of the work;
    - .5 The supply of accessories required for the installation of panels such as poles, braces, hardware;
    - .6 Implementation, maintenance, replacement in case of accident, breakage or vandalism of special panel;
    - .7 Special panel demobilization at the end of the work;
    - .8 Turning the sign on or off, as often as required;
    - .9 Temporary signage required during operations;
    - .10 Any incidental expenses.
- .8 Item 5.17- Securing Cycling and Pedestrian Link During Partial Closures or complete closure of Lafleur Bridge
  - .1 The price at payment item 5.17 of the Bid Form is a daily price for the securing of the cycling and pedestrian link during partial closures or complete closure of the Lafleur bridge, in accordance with the specifications and drawings as well as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 Signage of 2 meters wide bicycle and pedestrian crossings on the bridge (Lafleur), including all necessary safety measures to maintain a safe cycling and pedestrian connection;
    - .2 Preparation of all signaling drawings;
    - .3 Preparation of obstruction requests;

- .4 Provision of all signaling personnel, including signaling and site manager, and machinery and vehicles required for temporary signage;
  - .5 The mobilization of access to work areas, their maintenance and dismantling;
  - .6 The maintenance of the obstacle when it is of long duration;
  - .7 Supply, mobilization, maintenance, servicing, replacement in the event of breakage or vandalism, activation or deactivation, relocation and demobilization of temporary signage necessary for the execution of work on the entire site in accordance with the requirements of this document;
  - .8 Maintenance of signage and bicycle and pedestrian lanes including required inspections;
  - .9 Temporary signage, equipment and labor required for the complete performance of all work;
  - .10 Modification and refurbishment of existing signage;
  - .11 As well as other charges relating to the special requirements for the maintenance of traffic, as defined in the articles of section 01353-4;
  - .12 Any incidental expenses.
- .9 Items 5.18 to 5.20 - Variable Message Signs
- .1 The price at payment item 5.18 of the Bid Form is a unit price (sign/ day) for variable message signs, in accordance with the requirements of the specifications and drawings as well as directed by the Government Representative.
  - .2 The price at payment item 5.19 of the Bid Form is a unit price (sign/ week) for variable message signs, in accordance with the requirements of the specifications and drawings as well as directed by the Government Representative.
  - .3 The price at payment item 5.20 of the Bid form is a unit price (sign/ month) for variable message signs, in accordance with the requirements of the specifications and drawings as well as directed by the Government Representative.
  - .4 The price includes the following, but is not limited to:
    - .1 Supply, mobilization, programming, maintenance, servicing, any travel that may be required, replacement in case of breakage or vandalism, demobilization;
    - .2 Temporary signage for these operations and all the requirements of Parts 2 and 3 of Section 01353-5;
    - .3 Any incidental expenses.
- .10 Items 5.21 to 5.24 - Partial Closure of Lafleur Bridge (one lane out of two) - Short Term – Request of Government Representative (item 5.21), Partial Closure of Gauron Bridge (one lane out of two) - Short Term – Request of Government Representative (item 5.22), Complete Closure of Gauron Bridge – Short Term – Request of Government Representative (item 5.23), Complete Closure of Lafleur Bridge – Short Term – Request of Government Representative (item 5.24)



- .1 The prices at payment items 5.21 to 5.24 of the Bid Form are per unit price (night) for the maintenance of traffic and temporary signage, in accordance with the requirements of the specifications and drawings as well as directed by the Government Representative.
- .2 The price includes the following, but is not limited to:
  - .1 Maintenance of traffic and temporary signage;
  - .2 Preparation of all signaling drawings;
  - .3 Preparation of closing requests;
  - .4 Provision of all signaling personnel, including signaling manager and site manager, and machinery and vehicles required for temporary signage;
  - .5 The mobilization of access to work areas, their maintenance and dismantling;
  - .6 Maintenance of access to properties;
  - .7 The maintenance of the closure when it is of long duration;
  - .8 The closure of the right-hand lanes of Dollard Avenue in northern direction at the South approach of the intersection of Dollard Avenue and St. Patrick Street.
  - .9 Supply, mobilization, maintenance, servicing, replacement in the event of breakage or vandalism, activation or deactivation, relocation and demobilization of temporary signage required to perform work on the entire site in accordance with the requirements of this document;
  - .10 Maintenance of signs and circulation lanes including requested inspections;
  - .11 Temporary signage, equipment and manpower required for the complete performance of all work;
  - .12 Signage for cyclists and pedestrians;
  - .13 Modification and refurbishment of existing signage;
  - .14 As well as other charges relating to the special requirements for the maintenance of traffic, as defined in the articles of Section 01353-4;
  - .15 Any incidental expenses.
- .11 Items 5.25 and 5.26 - Complete Weekend Closure of Lafleur Bridge – Contra Flow Circulation on Gauron Bridge – Short Term – Request of Government Representative (item 5.25) and Complete Weekend Closure of Gauron Bridge – Contra-Flow on Lafleur Bridge – Short Term – Request of Government Representative (item 5.26)
  - .1 The prices at payment items 5.25 and 5.26 of the Bid Form are a unit price for the weekend work for the maintenance of traffic and temporary signage, in accordance with specifications and drawings as well as directed by the Government Representative.
  - .2 The price includes the following, but is not limited to:
    - .1 Maintenance of traffic and temporary signage;
    - .2 Preparation of all signaling drawings;



- .3 Preparation of closing requests;
- .4 Provision of all signaling personnel, including signaling manager and site manager, and machinery and vehicles required for temporary signage;
- .5 Mobilization of access to work areas, maintenance and dismantling;
- .6 Maintenance of access to properties;
- .7 Supply of sufficient number of signalmen to manage traffic at the intersection of Dollard Avenue and St. Patrick Street;
- .8 The closure of the right-hand lanes from Dollard Avenue in a northerly direction to the south approach of the intersection of Dollard Avenue and St. Patrick Street.
- .9 Maintain closure throughout the weekend;
- .10 Supply, mobilization, maintenance, servicing, replacement in the event of breakage or vandalism, activation or deactivation, relocation and demobilization of temporary signage necessary to carry out work on the entire site in accordance with the requirements of this document;
- .11 Maintenance of signs and circulation lanes including requested inspections;
- .12 Temporary signage, equipment and labor required for the complete performance of all work;
- .13 Signage for cyclists and pedestrians;
- .14 Modification and refurbishment of existing signage;
- .15 As well as other charges relating to the special requirements for the maintenance of traffic, as defined in the articles of Section 01353-4;
- .16 Any incidental expenses.

**Part 6 Item 6 - VI – ELECTRICITY**

**6.1 Item 6.1 - Work on Gauron Bridge (N°7)**

- .1 Item 6.1.1 Type A Lighting Fixture
  - .1 The price at payment item 6.1.1 of the Bid Form is a unit price per lighting fixture which include supply and installation of materials, labor and equipment, fixture, tenon, wiring, fuse holder , fuses, connectors, console, nameplate, bolts, piercings, hardware, accessories, etc., as well as any inherent expenses necessary for a complete and functional installation, as described in the drawings and quote.
  - .2 The price also includes the junction box, conduit section and wiring for connection to the existing ducting and wiring network.
- .2 Item 6.1.2 Type B Lighting Fixture
  - .1 The price at payment item 6.1.2 of the Bid Form is a unit price per lighting fixture which include supply and installation of materials, labor and equipment, fixture, tenon, wiring, fuse holder , fuses, connectors, console, nameplate, bolts, piercings,

- hardware, accessories, etc., as well as any inherent expenses necessary for a complete and functional installation, as described in the drawings and quote.
- .2 The price also includes the junction box, conduit section and wiring for connection to the existing ducting and wiring network.
  - .3 Item 6.1.3 Modification to the Duct and Wiring Network
    - .1 The price at payment item 6.1.3 of the Bid Form is a lump sum overall price which include the supply and installation of ducts, elbows, junction boxes, unions, expansion joints, fasteners, supports, profiles, conductors, materials, pulling rope and equipment, accessories, hardware and all labor and incidental expenses for a complete and functional installation
    - .2 The price also includes the removal and reinstallation of the conductors in the conduits.
  - .4 Item 6.1.4 Demolition
    - .1 The price at payment item 6.1.4 of the Bid Form is a lump sum overall price which include the supply of equipment labor as well as machinery, dismantling of lampposts, light fixtures, consoles, loading, transportation and unloading of drums, consoles and lighting at Parks Canada workshop's, the disposition of the materials, as well as any incidental expenses required for the execution of the work.
    - .2 The price also includes the removal of the lighting control and power cabinet, duct sections, expansion joints, earth continuity, boxes, conductors, brackets, fasteners, photocell, hardware and accessories as well as the protection of existing conductors.

## **6.2 Item 6.2 - Work on Lafleur Bridge (N°7A)**

- .1 Item 6.2.1 Type C Lamp Post
  - .1 The price at payment item 6.2.1 of the Bid Form is a unit price per lamp post which include the supply and installation of materials, labor and equipment, the shaft, the console, the fixture, the post, the wiring, fuse holder, fuses, connectors, console, nameplate, bolts, holes, hardware, accessories, etc., as well as any inherent expenses necessary for a complete and functional installation , as described in drawings and specifications.
  - .2 Price also includes conduit section and wiring for connection to existing ducting and wiring network.
- .2 Item 6.2.2 Type D Lighting Fixture
  - .1 The price at payment item 6.2.2 of the Bid Form is a unit price per lighting fixture which include supply and installation of materials, labor and equipment, fixture, post, wiring, fuse holder , fuses, connectors, console, nameplate, bolts, piercings, hardware, accessories, etc., as well as any inherent expenses necessary for a complete and functional installation, as described in the drawing and specifications.
  - .2 The price also includes the junction box, conduit section and wiring for connection to the existing ducting and wiring network.

- .3 Item 6.2.3 Type E Lighting Fixture
  - .1 The price at payment item 6.2.3 of the Bid Form is a unit price per lighting fixture which include supply and installation of materials, labor and equipment, fixture, post, wiring, fuse holder , fuses, connectors, console, nameplate, bolts, piercings, hardware, accessories, etc., as well as any inherent expenses necessary for a complete and functional installation, as described in the drawing and specifications.
  - .2 The price also includes the junction box, conduit section and wiring for connection to the existing ducting and wiring network.
- .4 Item 6.2.4 Type F Lighting Fixture
  - .1 The price at payment item 6.2.4 of the Bid Form is a unit price per lighting fixture which include supply and installation of materials, labor and equipment, fixture, post, wiring, fuse holder , fuses, connectors, console, nameplate, bolts, piercings, hardware, accessories, etc., as well as any inherent expenses necessary for a complete and functional installation, as described in the drawing and specifications.
  - .2 The price also includes the junction box, conduit section and wiring for connection to the existing ducting and wiring network.
- .5 Item 6.2.5 Modification to the Duct and Wiring Network
  - .1 The price at payment item 6.2.5 of the Bid Form is a lump sum overall price which include the supply and installation of ducts, elbows, junction boxes, unions, expansion joints, fasteners, supports, profiles, conductors, materials, ropes draw and equipment, accessories, hardware and all labor and incidental expenses for a complete and functional installation
  - .2 The price also includes the removal and reinstallation of the conductors in the conduits.
- .6 Item 6.2.6 Temporary Lighting
  - .1 The price at payment item 6.2.6 of the Bid Form is a lump sum overall price which include the supply and installation of poles, fixtures, brackets, wiring, conduit, supply and distribution points, wiring, hardware, accessories, and all expenses incidentals for a complete and functional installation.
  - .2 The price also includes any modifications to the existing system, relocations, conduit extensions, bypass for the power supply, etc.
- .7 Item 6.2.7 Power and Lighting Control Cabinet
  - .1 The price at payment item 6.2.6 of the Bid Form is a lump sum overall price which include the supply and installation of lighting and power control cabinet, ducts and conductors, components, circuit breaker panel, circuit breakers, timer, contactor, accessories , earth continuity, the hardware, the profiles for the support of the cabinet on the structure as well as all incidental expenses for a complete and functional installation.
- .8 Item 6.2.8 Demolition

- .1 The price at payment item 6.2.6 of the Bid Form is a lump sum overall price which include the supply of equipment labor as well as machinery, dismantling of lampposts, light fixtures, consoles, loading, transportation and unloading of drums, consoles and lighting at Park Canada workshop's, the disposition of the materials, as well as any incidental expenses required for the execution of the work.
- .2 The price also includes the removal of the lighting control and power cabinet, duct sections, expansion joints, earth continuity, boxes, conductors, brackets, fasteners, photocell, hardware and accessories as well as the protection of existing conductors.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1      Section 02 41 13.13 – *Paving Removal*
- .2      Section 02 41 16 – *Structure Demolition*
- .3      Section 02 83 12 – *Lead Base Paint Abatement – Maximum Precautions*
- .4      Section 03 10 00 – *Concrete Forming*
- .5      Section 03 20 00 – *Concrete Reinforcing*
- .6      Section 03 30 00 – *Cast-in-place Concrete*
- .7      Section 03 30 03 – *Concrete Repairs*
- .8      Section 05 12 33 – *Structural Steel for Bridges*
- .9      Section 05 55 00 – *Metal Fabrication*
- .10     Section 07 13 52 – *Modified Bituminous Sheet Waterproofing*
- .11     Section 09 91 13.23 – *Exterior Painting of Structural Steel*
- .12     Section 31 05 16 – *Aggregates for Earthwork*
- .13     Section 32 12 16 – *Bituminous Pavement Covering*
- .14     Section 32 17 23 – *Pavement Marking*
- .15     Section 34 71 13.25 – *Vehicle W-Beam Guide Rail*

**1.2                PRICES AND TERMS OF PAYMENT**

- .1      The costs incurred for project meetings must be included in the price tendered at each payment item concerned on the Submitting Slip.

**1.3                ADMINISTRATIVE**

- .1      Schedule and administer project meetings throughout the duration of the work every two (2) weeks.
- .2      The Government Representative will prepare the agenda for meetings.
- .3      The Government Representative will distribute written notice of each meeting four (4) days in advance of meeting date to the Contractor, the Parks Canada Agency (PCA) Project Manager and if required, the Design Engineer.
- .4      Provide physical space and make arrangements for meetings.
- .5      The Government Representative will preside at meetings.
- .6      The Government Representative will record the meeting minutes. Minutes shall include significant proceedings and decisions, as well as the identification of actions by parties.
- .7      Copies of the meeting minutes will be distributed within seven (7) days after meetings to meeting participants and affected parties not in attendance.

- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- .9 Provide a schedule of specific meeting indicated in all specification section to allow tracking of work execution and all other meeting required.

#### 1.4 PRECONSTRUCTION MEETING

- .1 Within ten (10) days after award of Contract, the Government Representative will request a kick-off meeting in order to discuss administrative procedures and determine each parties responsibilities.
- .2 The PCA Project Manager, Design Engineer, Government Representative, Contractor and main Subcontractors will be in attendance.
- .3 The Government Representative will determine the time and location of meeting and notify concerned parties a minimum five (5) days before the meeting.
- .4 Incorporate mutually agreed modifications to Contract Documents prior to signing the agreement.
- .5 Agenda for kick-off meeting shall include:
  - .1 Designation of official representatives of participants in the work.
  - .2 The Site Facilities Development Plan;
  - .3 The order of execution of the work;
  - .4 Workshop drawing of temporary access systems (Walkways)
  - .5 General plans (GANTT diagram) and work schedule.
  - .6 Signalisation boards;
  - .7 Surveys;
  - .8 Environmental protection plan (EPP);
  - .9 Schedule for the submission of shop drawings, product samples and color samples, according to section 01 33 00 – *Submittal Procedures*.
  - .10 Requirements for temporary installations, site signage, offices, sheds and storage facilities, utilities and fencing, according to section 01 52 00 – *Construction Facilities*.
  - .11 Delivery schedule for prescribed materials and equipment, for each bridge.
  - .12 Site security, in accordance with section 01 56 00 – *Temporary Barriers and Enclosures*.
  - .13 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .14 Owner provided products.
  - .15 Record drawings in accordance with Section 01 33 00 - *Submittal Procedures*.
  - .16 Procedures for close-out and acceptance, and warranties.
  - .17 Monthly progress claims, administrative procedures, photographs, hold backs.
  - .18 Appointment of inspection and testing agencies or firms.
  - .19 Insurances, transcript of policies.

## 1.5 PROGRESS MEETINGS

- .1 Throughout the duration of the Work and until completion of Work, the Government Representative will schedule progress meeting every two (2) weeks.
- .2 Contractor, main Subcontractors involved in Work, PCA Project Manager and Government Representative will be in attendance.
- .3 The Government Representative shall notify parties a minimum of five (5) days prior to the meetings.
- .4 The contractor must send to the Government Representative a schedule of the actual progress of the work at least twenty-four (24) hours before the meetings. This schedule should allow comparison of the actual progress versus the basic schedule.
- .5 The Government Representative will record the minutes of meetings and distribute them to attending parties and affected parties not in attendance within five (5) days after meeting.
- .6 Agenda to include the following:
  - .1 Review, approval of minutes of previous meeting.
  - .2 Review of Work progress since previous meeting.
  - .3 Field observations, problems, conflicts.
  - .4 Health and safety requirements.
  - .5 Problems which impede construction schedule.
  - .6 Review of off-site fabrication delivery schedules.
  - .7 Corrective measures and procedures to regain projected schedule.
  - .8 Revision to construction schedule.
  - .9 Progress schedule, during succeeding work period.
  - .10 Review submittal schedules: expedite as required.
  - .11 Maintenance of quality standards.
  - .12 Review proposed changes for affect on construction schedule and on completion date.
  - .13 Other business.

## 1.6 PRE-IMPLEMENTATION MEETINGS

- .1 Must be present at these meetings: The Contractor including the engineer who signed the procedure and his main subcontractors participating in the work, the Representative of the Test Laboratory and the Government Representative.
- .2 The Government Representative notifies the parties at least five (5) working days before the meetings are held.
- .3 The meeting takes place only after the working procedure is deemed complete by the Government Representative. The meeting agenda must provide the review of the procedure and contractual requirements relating to implementation.

**Part 2            Products**

**2.1                NOT USED**

.1            Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**



## Part 1 General

### 1.1 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally, Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five days work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 **Master Plan:** summary-level schedule that identifies major activities and key milestones.
- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 **Project Schedule:** planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by Government Representative to enable monitoring of project work in relation to established milestones.

### 1.2 REQUIREMENTS

- .1 Ensure Master Plan and Project Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately ten (10) working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Interim Certificate and Final Certificate as defined times of completion are of essence of this contract.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Submit to Government Representative within **seven (7) working days** of Award of Contract Bar (GANTT) Chart as **Master Plan** for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Government Representative within **five (5) working days** of receipt of **acceptance of Master Plan**.

### 1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule according to the work provided for in the Submitting Slip:
  - .1 Gauron Bridge:
    - .1 Foundation repairs North and South abutments;
    - .2 Injection crack repair at North abutment;
    - .3 South wall repairs;
    - .4 Replacement of deck joints of north and south abutments;
    - .5 Cleaning of manholes;
    - .6 Surface preparation and painting of bearings at the south abutment;
    - .7 Reinforcement of the steel structure;
    - .8 Surface preparation and painting of existing steel surfaces on site;
    - .9 Work to replace the rolling surface of the deck and above the tunnel;
    - .10 Work to replace rolling surface at approaches;
    - .11 Work on the structure of the counterweight;
    - .12 Supply and installation of new height limit signs;
  - .2 Lafleur Bridge
    - .1 Wall repairs between South abutments;
    - .2 Replacement of deck joints at South abutment;
    - .3 Replacement of compression seal at center and North abutment deck joint;
    - .4 Replacement of the rolling surface of span 1;
    - .5 Replacement of rolling surface at South approach;
    - .6 Work on counterweight structure;
  - .3 Survey records;
  - .4 All other work provided in the plans and specifications as well as the Submitting Slip.

### 1.5 MASTER PLAN

- .1 Structure Project Schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).

- .2 Government Representative will review and return revised schedules within **five (5) working days** following reception.
- .3 Revise impractical schedule and resubmit within **five (5) working days**.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

## 1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
  - .1 Award.
  - .2 Shop Drawings, Samples and Approval Times.
  - .3 Permits.
  - .4 Mobilization/Demobilization.
  - .5 Minimally one task for each item of the Submitting Slip;
  - .6 Cure time;
  - .7 Project specific milestones and all other required tasks and deliverables;

## 1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on **weekly** basis reflecting activity changes and completions, as well as activities in progress.
- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

## 1.8 FOUR (4) WEEKS SCHEDULE

- .1 Develop a four (4) week schedule to present the main activities.
- .2 The four (4) week schedule must include the following criteria:
  - .1 The previous week with the confirmation of execution of the main activities;
  - .2 Current week with main planned activities;
  - .3 The next two (2) weeks with planned main activities;
  - .4 Update schedule four (4) weeks once a week and forward to Government Representative. The calendar must be in Excel (.XLS) format.

## 1.9 MONITORING PLAN FOR WORK PROGRESS

- .1 Develop a graphical progress follow-up (PDF format 11"x17 ") from the intervention sector plans to present the productivity of key activities, such as: excavation, demolition, concreting, etc.;
- .2 Update this follow-up before each site meeting, every two (2) weeks.

**1.10 PROJECT MEETINGS**

- .1 Hold meetings in accordance with Section 01 31 19 - *Project Meetings*.
- .2 Discuss Project Schedule at regular site meetings, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .3 Weather related delays with their remedial measures will be discussed and negotiated.

**1.11 DAILY PLANNING**

- .1 Develop a daily plan to present the main activities.
- .2 Transmit to Government Representative the daily planning no later than 2:00 pm for the next day's planning. The schedule must be in Excel (.XLS) format.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 13.13 – *Paving Removal*
- .2 Section 02 41 16 – *Structure Demolition*
- .3 Section 02 83 12 – *Lead Base Paint Abatement – Maximum Precautions*
- .4 Section 03 10 00 – *Concrete Forming*
- .5 Section 03 20 00 – *Concrete Reinforcing*
- .6 Section 03 30 00 – *Cast-in-place Concrete*
- .7 Section 03 30 03 – *Concrete Repairs*
- .8 Section 05 12 33 – *Structural Steel for Bridges*
- .9 Section 05 55 00 – *Metal Fabrication*
- .10 Section 07 13 52 – *Modified Bituminous Sheet Waterproofing*
- .11 Section 09 91 13.23 – *Exterior Painting of Structural Steel*
- .12 Section 31 05 16 – *Aggregates for Earthwork*
- .13 Section 32 12 16 – *Bituminous Pavement Covering*
- .14 Section 32 17 23 – *Pavement Marking*
- .15 Section 34 71 13.25 – *Vehicle W-Beam Guide Rail*

**1.2 REFERENCE STANDARDS**

- .1 Not Used.

**1.3 ADMINISTRATIVE**

- .1 The Contractor shall provide the list of Subcontractors with proof of contracts within two (2) weeks of the awarding of the contract with Parks Canada Agency.
- .2 The Contractor shall order the deck joints no longer than two (2) weeks after the awarding of the contract with Parks Canada Agency. Proof of these orders must be submitted to the Government Representative no later than two (2) weeks after awarding of the contract.
- .3 Submit submittals listed for review to Government Representative promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .4 Do not proceed with Work affected by submittal until review is complete.
- .5 Present shop drawings, product data, samples and mock-ups in SI Metric units.

- .6 Where items or information is not produced in SI Metric units converted values are acceptable.
- .7 Examine documents and samples before submitting them to the Government Representative. By this prior verification, **the Contractor confirms that the requirements applicable to the work have been or will be determined and verified**, and that each of the documents and samples submitted has been examined and found to comply with the requirements of the works and contractual documents. **Documents and samples that are not stamped, signed, dated and identified in connection with the particular project will be returned without being examined and will be considered rejected.**
- .8 Notify in writing the Government Representative, when submitting the documents and samples, of the deviations that these present in relation to the requirements of the Contractual Documents and explain the reasons therefor.
- .9 Ensure the accuracy of the measurements taken on site in relation to the adjacent structures affected by the work.
- .10 The fact that the documents and samples submitted are examined by the Government Representative does not release the Contractor from his responsibility to send complete and accurate documents.
- .11 The fact that the documents and samples submitted are examined by the Government Representative does not release the Contractor from his responsibility to transmit documents that comply with the requirements of the Contractual Documents.
- .12 Keep a verified copy of each document submitted on site.
- .13 In addition to current information, provide all additional details that apply to the work.

#### 1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 This section lists general requirements and procedures relating to shop drawings and to product and sample descriptions submitted by the Contractor to the Engineer for review. Other specific requirements are listed in appropriate sections.
- .2 The term “**shop drawings**” means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .3 Submit drawings stamped and signed by professional engineer registered with the Ordre des ingénieurs du Québec.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Allow, at least fourteen (14) days for the Government Representative to review of each submission.

- .6 Submit, to the Government Representative, the documents according to the deadlines prescribed in specification 011100 – *Work Summary*. All other documents not included in the specification section 011100 - *Work Summary* must be submitted to the Government Representative seven (7) working days before the start of the work subject to this requirement.
- .7 Adjustments made on shop drawings by the Government Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Government Representative prior to proceeding with Work.
- .8 Make changes in shop drawings as the Government Representative may require, consistent with Contract Documents. When resubmitting, notify the Government Representative in writing of revisions other than those requested.
- .9 Accompany submissions with transmittal letter (frontispiece page), containing the following information:
  - .1 Date;
  - .2 Project title and number.
  - .3 The name and address of the Contractor;
  - .4 The designation of each drawing, technical sheet, execution procedure, samples as well as the number submitted;
  - .5 The number of pages;
  - .6 Reference to plans and specifications;
  - .7 Any other relevant data.

An incomplete transmission of the frontispiece page will formalize the refusal of the document and it must be resubmitted.
- .10 Documents submitted must bear or indicate the following:
  - .1 The date of preparation and the dates of revision;
  - .2 Project title and number.
  - .3 Intervention sectors;
  - .4 References to plans and specifications;
  - .5 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.
  - .6 The seal of the engineer member in good standing of the Ordre des ingénieurs du Québec, hired by the Contractor, who supervised the issuance of the document;
  - .7 The Contractor's stamp, signed by the latter's authorized representative, certifying that the documents submitted are approved, that the measures taken on site have been verified and that the assembly complies with the requirements of the Contractual Documents;
  - .8 Relevant details concerning the portions of work concerned:

- .1 The distances, lengths, widths, diameters, depths and spacing of the assemblies; The layout or configuration, with the dimensions, including those taken on site, as well as the clearances and clearances;
  - .2 Layout or configuration, with dimensions, including those taken on site, as well as tolerances and clearances;
  - .3 Details regarding mounting or adjustment;
  - .4 Specific drawings and diagrams, sections, elevations, plan views, etc .;
  - .5 Characteristics such as power, flow or capacity;
  - .6 Performance characteristics;
  - .7 Reference standards;
  - .8 Operational mass;
  - .9 Wiring diagrams;
  - .10 Single line diagrams and schematic diagrams;
  - .11 Materials and manufacturing details;
  - .12 Links with adjacent structures.
- .11 When the shop drawings have been checked by the Government Representative and no error or omission has been detected or only minor corrections have been made, one (1) PDF format copy with annotation will be returned, and the shaping and installation work can then be undertaken. If the shop drawings are rejected, one (1) annotated copy will be returned and the corrected shop drawings must be resubmitted according to the above instructions before shaping and installation work can be undertaken.
- .12 The review of shop drawings by the Parks Canada Agency (PCA) is only to verify compliance with the general concept of the data indicated on the latter.
- .1 This review does not mean that the PCA approves the shop drawings, this responsibility for accuracy rests with the Contractor who submits them, nor does he release the latter from the obligation to send drawings of complete and accurate workshop, and comply with all requirements of the work and contractual documents.
  - .2 Without limiting the generality of the foregoing, it is important to specify that the Contractor **is responsible for the accuracy of the dimensions confirmed on site**, for the supply of information relating to shaping methods or construction techniques and installation and coordination of the work performed by all trades.
- .13 Distribute copies of shop drawings and technical data sheets once the Government Representative has finished verifying them.
- .14 Submit one (1) printed copy and one (1) electronic copy of the shop drawings prescribed in the technical sections of the specifications and according to the reasonable requirements of the Government Representative.
- .15 If no shop drawing is required due to the use of a standard manufacturing product, submit one (1) printed copy and one (1) electronic copy of the prescribed technical data sheets or manufacturer's documentation in the technical sections of the estimate and required by the Government Representative.



- .16 Submit one (1) printed copy and one (1) electronic copy of the manufacturer's instructions prescribed in the technical sections of the specification and required by the Government Representative.
  - .1 Pre-printed documents describing the installation method for products, equipment and systems, including specific notices and data sheets indicating the impedances, the risks and the safety measures to be implemented.
- .17 Submit the follow-up register of documents to be submitted at least once a week..

## 1.5 SAMPLES

- .1 Make samples of required work in accordance with section 01 45 00 - *Quality control*.
- .2 Submit, fifteen (15) working days before the start of work subject to this requirement, the three (3) product samples for examination, in accordance with the requirements of the technical sections of the specifications. Label the samples, indicating their origin and intended destination.
- .3 Ship prepaid samples to the site office of the Government Representative.
- .4 Notify the Government Representative in writing, at the time of the presentation of the samples of products, of the deviations which they present compared to the requirements of the Contractual Documents.
- .5 Where color, pattern or texture is prescribed, submit the full range of samples required.
- .6 The modifications made to the samples by the Government Representative are not supposed to vary the contract price. If this is the case, however, notify the Government Representative in writing before starting the work.
- .7 Make changes to samples that may be requested by the Government Representative while respecting the requirements of the Contract Documents.
- .8 The examined and approved samples will become the reference standard from which the quality of materials and the quality of execution of finished and installed works will be assessed.

## 1.6 TEST REPORTS

- .1 Submit to the Government Representative, at least two (2) weeks before the start of the work subject to this requirement, one (1) printed copy and one (1) electronic copy of the test reports prescribed in the technical sections of the specifications and required by the Government Representative.
  - .1 The report signed by the official representative of the test laboratory must certify that materials, products or systems identical to those proposed in the context of the work have been tested in accordance with the prescribed requirements.
  - .2 The tests must have been carried out in the five (5) years preceding the date of contract award.
- .2 Submit one (1) printed copy and one (1) electronic copy of manufacturer's on-site inspection reports, prescribed in the technical sections of the specifications and required by the Government Representative.

- .3 Reports of tests and verifications having been carried out by the manufacturer's representative in order to confirm the conformity of the products, materials, materials or systems installed with the manufacturer's instructions.

## **1.7 CERTIFICATE OF CONFORMITY**

- .1 When a certificate of conformity is required in the drawings and specifications, the Contractor must make the inspections of the works and give the copies of the certificates of conformity to the Government Representative after the construction and inspection of the works and during the works.
- .2 The certificate of conformity must bear the seal and signature of a recognized competent engineer and member in good standing of the Ordre des ingénieurs du Québec.
- .3 Submit one (1) printed copy and one (1) electronic copy of the certificates prescribed in the technical sections of the specifications and required by the Government Representative.

## **1.8 CERTIFICATES**

- .1 When certification is required in plans and specifications, the contractor must deliver copies of the certificate to the Government Representative at least seven (7) working days before the start of the work subject to this requirement unless otherwise specified in a specific section. The certificate must be valid for the duration of this work
- .2 Submit one (1) printed copy and one (1) electronic copy of certificates prescribed in the technical sections of the specifications and required by the Government Representative.
  - .1 Documents, printed on manufacturer's official correspondence paper and signed by a representative of the latter, must certify that the products, materials, materials and systems supplied comply with the specifications of the specifications.
  - .2 Certificates must bear a date after contract award and indicate the project designation.

## **1.9 LABOR QUALIFICATION**

- .1 When a qualification is required in plans and specifications, the contractor must submit a copy of the certificate to the Government Representative at least seven (7) working days before the start of the work subject to this requirement unless otherwise specified in a specific section. The certificate must be valid for the duration of this work
- .2 Submit one (1) printed copy and one (1) electronic copy of the workforce qualification certificates prescribed in the technical sections of the specifications and required by the Government Representative.

## **1.10 SOURCE OF SUPPLY**

- .1 Submit to the Government Representative, four (4) weeks before deliveries and / or the start of work subject to this requirement, the name, address of the manufacturer.

**1.11 OPERATING SHEETS**

- .1 Submit one (1) printed copy and one (1) electronic copy of operating and maintenance sheets prescribed in the technical sections of the specifications and required by the Government Representative.

**1.12 PHOTOGRAPHIC DOCUMENTATION**

- .1 Not used.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

## **Part 1 General**

### **1.1**

- .1 Section 02 41 13.13 – *Paving Removal.*
- .2 Section 02 41 16 – *Structure Demolition.*
- .3 Section 02 83 12 – *Lead Base Paint Abatement – Maximum Precaution.*
- .4 Section 03 10 00 – *Concrete Forming.*
- .5 Section 03 20 00 – *Concrete Reinforcing.*
- .6 Section 03 30 00 – *Cast-in-place Concrete.*
- .7 Section 03 30 03 – *Concrete Repairs*
- .8 Section 05 12 33 – *Structural Steel for Bridges*
- .9 Section 05 55 00 – *Metal Fabrication*
- .10 Section 07 13 52 – *Modified Bituminous Sheet Waterproofing*
- .11 Section 09 91 13.23 – *Exterior Painting of Structural Steel*
- .12 Section 31 05 16 – *Aggregates for Earthwork*
- .13 Section 32 12 16 – *Bituminous Pavement Covering*
- .14 Section 32 17 23 – *Pavement Marking*
- .15 Section 34 71 13.25 – *Vehicle W-Beam Guide Rail*

### **1.2 SECTION CONTENTS**

- .1 The Contractor shall manage its activities so that the health and safety of the public and of the site / work site personnel and the protection of the environment always take precedence over cost and schedule issues.

### **1.3 REFERENCE STANDARDS**

- .1 Canada Labor Code, Part II, Canada Occupational Safety and Health Regulations
- .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
- .3 Province of Quebec
  - .1 Loi sur la santé et la sécurité du travail, L.R.Q., c. S-2.1 (latest edition).

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1 Results of site-specific safety hazard assessment.

- .2 Results of safety and health risk or hazard analysis for site tasks and operation.
- .3 Submit to the Government Representative once a week, two (2) copies of the health and safety inspection reports carried out on the site by the authorized representative of the Contractor.
- .4 Submit copies of directives or reports prepared by federal, provincial and municipal health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS Material Safety Data Sheets (MSDSs) for the various products used on site during the work.
- .7 The Government Representative will review the health and safety plan prepared by the Contractor for the site and will provide him with his observations within five (5) days of receipt of this document. If necessary, the Contractor will revise his health and safety plan and resubmit it to the Government Representative no later than five (5) days after receipt of the observations of the Government Representative.
- .8 The review by the Government Representative of the final health and safety plan prepared by the Contractor for the site must not be interpreted as an approval of this plan and does not in any way limit the overall responsibility of the Contractor for health and safety during construction.
- .9 Medical surveillance: Where required by a law, regulation or safety program, submit, before starting work, certification of medical surveillance of personnel working on the site.
- .10 Emergency response plan: state the procedures and procedures to follow in the event of an emergency on site..

## **1.5 FILING OF NOTICE**

- .1 The contractor may not start the work before having notified in writing at least ten (10) working days in advance the Commission of standards, equity, health and safety at work (CNESST ) from the opening date of the site.

## **1.6 SAFETY ASSESSMENT**

- .1 Perform site specific safety hazard assessment related to project.
- .2 It is the Contractor's responsibility to carry out verifications and ensure that no Work is done too close to the edge of the walls of the Lachine Canal. These verifications are required as to not damage the walls and prevent risks of instability and collapse of the walls.

## **1.7 MEETINGS**

- .1 Schedule and administer Health and Safety meeting with the Government Representative prior to commencement of Work.
- .2 Notify the Government Representative about the meeting at least five (5) days in advance.

## **1.8 REGULATORY REQUIREMENTS**

- .1 Do Work in accordance with the requirements of authorities having jurisdiction in the City of Montreal territory.

## **1.9 GENERAL REQUIREMENTS**

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 The Government Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

## **1.10 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Contractor shall be the Principal Contractor as described in the Quebec Act Respecting Health and Safety code for the Construction for only their scope and areas of work as defined and described this project specification.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

## **1.11 COMPLIANCE REQUIREMENTS**

- .1 Comply with the Loi sur la santé et la sécurité du travail, L.R.Q., c. S-2.1, and to Code de sécurité pour les travaux de construction, c. S-2.1, r. 4.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

## **1.12 UNFORSEEN HAZARDS**

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province of Quebec and advise the Government Representative verbally and in writing.

## **1.13 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign a competent and authorized person as Health and Safety Coordinator to the work. The health and safety coordinator must meet the following criteria:
  - .1 Have site-related working experience specific to activities associated with
  - .2 Have working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor s Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor s Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of the Government Representative.

**1.14 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of the Province of Quebec having jurisdiction, and in consultation with the Government Representative.

**1.15 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by the Government Representative.
- .2 Provide Government Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 The Government Representative may stop Work if non-compliance of health and safety regulations is not corrected by the Contractor.

**1.16 BLASTING**

- .1 Blasting or other use of explosives is not permitted on the site.

**1.17 POWDER ACTUATED DEVICES**

- .1 Use powder actuated devices only after receipt of written permission from the Government Representative.

**1.18 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

**1.19 HIGH-PRESSURE WATERJET CLEANING**

- .1 Pressure water jet cleaning operations are required to remove pigeon droppings, de-icing salts, dirt and other contaminants deposited on the elements of deck 7 (Gauron) and deck 7A (Lafleur), in work areas.
- .2 Clean surfaces with a medium-pressure waterjet: pressure between 350 kPa (50 lb/po<sup>2</sup>) and 2,700 kPa (400 lb/po<sup>2</sup>) as measured at the end of the nozzle.
- .3 Perform cleaning tests on each type of surface to determine effectiveness of medium-pressure waterjet cleaning.
- .4 Notify Government Representative twenty-four (24) hours before beginning work.
- .5 Perform tests to determine the following parameters for high-pressure waterjet cleaning of surfaces:
  - .1 Water pressure;

- .2 Water discharge;
- .3 Nozzle type for different surfaces;
- .4 Projection distance.
- .6 Stop test when desired level of cleanliness is achieved and suspend test immediately if any damage is caused.
- .7 Tests should be performed on concealed or less visible surfaces chosen by Government Representative.
- .8 Do not begin work before the sample has been approved.
- .9 Once approved, the sample will serve as the minimum quality standard for this work.
- .10 Use clean potable water, free of contaminants.
- .11 Tools and equipment:
  - .1 Natural fibre or plastic bristle brushes only.
  - .2 Wood or plastic scrapers only.
  - .3 Water pumps equipped with accurate pressure regulators and gauges that can be pre-set and locked to the maximum pressures specified.
  - .4 Air compressors equipped with oil filters to prevent oil being sprayed on masonry.
  - .5 Nozzle lance equipped with pressure gauge.
  - .6 Ensure that workers wear protective goggles, hard hats, masks, gloves and clothing, as well as boots and respiratory protection devices, in compliance with the relevant MSHA/NIOSH standards.
- .12 Arrange enclosures using tarpaulins attached to access structures and existing structure in order to limit the spread of water.
- .13 Provide access structures for cleaning operations or use the access platforms installed to carry out repairs.
  - .1 If access platforms are used, comply with the following requirements:
    - .1 Do not install containment shelters on platforms before the start of cleaning;
    - .2 Cover platform surfaces with waterproof sheets and fasten so as not to be displaced by wind;
    - .3 Collect all cleaning materials placed on platform surfaces;
    - .4 Properly clean all platform surfaces that came into contact with contaminants produced by cleaning.
    - .5 Remove waterproof sheets;
    - .6 Dispose of materials resulting from cleaning off-site in accordance with regulations in effect in the City of Montreal.



**Part 2            Products**

**2.1                NOT USED**

.1            Not used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not used.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 13.13 – Paving Removal.
- .2 Section 02 41 16 – Structure Demolition.
- .3 Section 02 83 12 – Lead Base Paint Abatement – Maximum Precautions
- .4 Section 03 10 00 – Concrete Forming.
- .5 Section 03 20 00 – Concrete Reinforcing.
- .6 Section 03 30 00 – Cast-in-place Concrete.
- .7 Section 03 30 03 – Concrete Repairs.
- .8 Section 05 12 33 – Structural Steel for Bridges.
- .9 Section 05 50 00 – Metal Fabrication.
- .10 Section 07 13 52 – Modified Bituminous Sheet Waterproofing.
- .11 Section 09 91 13.23 – Exterior Painting of Structural Steel.
- .12 Section 31 05 16 – Aggregates for Earthwork.
- .13 Section 32 12 16 – Asphalt Paving.
- .14 Section 32 17 23 – Pavement Marking.
- .15 Section 34 71 13.25 – Vehicle W-Beam Guide Rail.

**1.2 REFERENCE**

- .1 Historic Canals Regulations (SOR/93-220)
- .2 Fisheries Act (R.S.C., 1985, c. F-14)
- .3 Migratory Birds Convention Act, 1994 (S.C. 1994, C. 22)
- .4 Species at Risk Act (S.C. 2002, C. 29)
- .5 Canadian Navigable Waters Act (R.S.C., 1985, C. N-22)
- .6 Impact Assessment Act, (S.C. 2019, c. 28, s. 1)
- .7 Definitions
  - .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
  - .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural

resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 Product data:
  - .1 Submit the required data sheets as well as the manufacturer's instructions and documentation concerning the products used in the execution of the work. The data sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits and the finish.
  - .2 Submit two (2) copies of WHMIS SDS in accordance with Section 01 35 29.06 – *Health and Safety Requirements*.
- .3 **Prior to commencement of construction activities** or delivery of materials and equipment to the site, submit **an Environmental Protection Plan** to the Government Representative for review and approval.
- .4 Environmental Protection Plan must provide a comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 The EPP Objective: An Environmental Protection Plan (EPP) is a document that describes site-specific environmental protection actions and responsibilities during project implementation. It is intended to ensure that the environmental mitigation commitments and measures identified in the specifications are understood and appropriately implemented by the Contractor. The EPP must contain specific and direct guidelines to achieve the targeted environmental results in the mitigation measures.
- .6 The actions included in the Environmental Protection Plan must be presented in a level of detail that is consistent with the environmental problems and with the construction work to be carried out.
- .7 Include in Environmental Protection Plan:
  - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
  - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
  - .3 Names and qualifications of persons responsible for training site personnel.
  - .4 Descriptions of environmental protection personnel training program.
  - .5 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.
  - .6 **Traffic control plans**, including measures to reduce the erosion of temporary roadside platforms by the circulation of construction vehicles, especially during rainy weather.

- .1 These plans must include measures to reduce the transportation of materials on public roads by vehicles or runoff.
  - .7 **The Spill Control Plan** to include procedures, instructions, and reports to be used produced in the event of unforeseen spill of regulated substance. The Contractor must have the necessary equipment on site in case of a spill.
  - .8 **A plan for the disposal of non-hazardous solid waste**, including disposal methods and locations for this solid waste and debris from the clearing.
  - .9 **Air pollution control plan** detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
  - .10 **Contaminant Prevention Plan** identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
  - .11 **Waste Water Management Plan** identifying methods and procedures for management discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
  - .12 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.
  - .13 If required, a pesticide treatment plan, approved by the PCA process.
  - .14 **An erosion and sediment transport prevention plan**, indicating the measures to be implemented, including work monitoring and reporting to verify compliance with federal, provincial and federal laws and regulations and municipal.
  - .15 **A plan of the work area**, showing activities planned in each part of work area and indicating restricted use areas and prohibited areas of use.
- .8 **The mitigation and/or compensation measures described in the appendix** must be implemented to the satisfaction of Government Representative and be an integral part of the Environmental Protection Plan (EPP).
  - .9 See Appendix for example of a model of Environmental Protection Plan (EPP) recommended by PCA

#### 1.4 FIRES

- .1 Fires and burning of rubbish on site are not permitted.

#### 1.5 TURBIDITY CURTAIN

- .1 Install a sediment barrier, for use in the aquatic environment consisting of a membrane suspended from a float and weighted at the base by chains or other weights, to isolate from the rest of the body of water the part disturbed by the work in progress to prevent suspended sediments from spreading over a wider area. This curtain must comply with the requirements of the competent authorities. The turbidity curtain must be installed before the work begins, it must remain in place for the duration of the work, until all work is completed. The turbidity curtain must be removed or dismantled at the very end of the

work, when the sediments have sufficiently decanted and will be deposited at the bottom of the canal. Do not resuspend the sediment when removing the turbidity curtain.

- .2 Regularly inspect turbidity curtain installed to ensure there is no current movement, always maintain and keeping it in good condition to be effective.

## **1.6 BARRIER FOR CONTROL OF EROSION AND SEDIMENTS**

- .1 Any work that results in unconsolidated soil being left bare (excavation, disturbed soil, stockpiled materials, etc.) must be accompanied by erosion and sediment control measures in order to avoid sediments in water environments. As the work is completed, all disturbed areas must be permanently stabilized. If a delay is necessary before permanent stabilization, temporary erosion and sediment control measures must remain in place until conditions permit their removal and Government Representative authorizes their dismantling. Temporary measures must be withdrawn or dismantled only at the end of the work.
- .2 Establish a barrier for erosion and sediment control, to prevent soil loss from stormwater runoff or wind erosion and sweeping of that soil on properties and adjacent pedestrian routes. These measures must comply with requirements of the competent authorities.
- .3 Any temporary pile-up of unconsolidated materials, such as dirt, located less than 30 m from a water environment, for a period of more than 24 hours, must be protected with a sediment barrier in order to avoid sediment transport to the water environment.
- .4 Inspect erosion and sediment control systems, maintain them in a good condition to ensure they are always efficient and until the permanent vegetation is well established.
- .5 In case of prolonged exposure of the soil, use temporary stabilizing methods such as ground cover, mulch, straw, grass, granular material, erosion control cover or any other device that may reduce erosion of the soil.

## **1.7 DRAINAGE**

- .1 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .2 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials beyond applicable standards.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .4 It is prohibited to discharge water containing suspended solids or contaminants in the Lachine Canal.

## **1.8 SITE CLEARING AND PLANT PROTECTION**

- .1 Protect trees and plants on site and adjacent properties as indicated by Government Representative before the beginning of the works and for all the durations of the works. The Government Representative may stop the work if the protective measures are not carried out (via a notice of non-compliance).

- .2 Wrap in burlap trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum. The Contractor must ensure that there is no damage to the full height of the tree. If a tree or part of a tree (independent of the height) is damaged by the Contractor, the Contractor must perform an analysis and produce a report by a Forest Engineer to determine the nature of the damage, the condition of the tree, the methods of correction to be made, the interventions to be planned, an assessment of the survival potential of the tree and any other recommendation at the expense of the Contractor. Removal of trees and shrubs from work areas is prohibited unless written permission from the Parks Canada Representative is obtained prior to commencement of work.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.
- .4 If roots of a tree to be protected need to be cut during the work, implement the following measures:
  - .1 Cut the roots with a concrete saw (15 cm) and perform a gradual stripping where roots are or may be present.
  - .2 Use a geotextile to cover exposed roots.
  - .3 Affected trees must be watered regularly and abundantly during the work.
  - .4 Restore crown/root balance, based on percentage of loss of the root system, performing compensatory pruning where the same percentage of branches is removed, prioritizing diseased, deleterious, weak and/or misplaced branches.
  - .5 At the end of the work, the ground level must be identical to the one that was present before the work.
- .5 Minimize stripping of topsoil and vegetation.

## 1.9 WORK ADJACENT TO WATERWAYS

- .1 Waterway (Lachine Canal) must remain free of cuttings, waste materials or debris.
- .2 No debris or wastewater must be thrown into the Canal.
- .3 Used of the Canal waterway beds for borrow material is prohibited.
- .4 Canal waterway to be free of excavated fill, waste material and debris.
- .5 Machinery operating or operating less than 30m from a waterway **must** use **Biodegradable Hydraulic Oil**.
- .6 Construction machinery must be used from shore only.
- .7 No temporary structure may be installed over the Lachine Canal under Bridges Gauron (7) and Lafleur (7A) unless written authorization from PCA Project Manager is obtained before beginning of Work.
- .8 Do not skid logs or construction materials across waterways.
- .9 Blasting is prohibited on site.

- .10 It is forbidden to throw snow removed during snow clearing, as indicated in the Historic Canal Regulations, into the historic canal.

#### **1.10 POLLUTION CONTROL**

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
- .2 Control emissions from equipment and tools in accordance with local authorities emission requirements.
- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
  - .1 Provide temporary enclosures during sandblasting, cleaning and painting of abutment bearings and of steel surfaces on site.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

#### **1.11 HISTORICAL/ARCHAEOLOGICAL CONTROL**

- .1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site: and identifies procedures to be followed if historical archaeological, cultural resources, biological resources and wetlands not previously known to be onsite or in area are discovered during construction.
- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor's personnel and the Government Representative.

#### **1.12 NOTIFICATION**

- .1 **A written notice of non-compliance** will be issued to the Contractor by Government Representative whenever a non-compliance with a federal, provincial or municipal law, regulation or permit or any other element of the Environmental Protection Plan (EPP) implemented by the Contractor.
- .2 Upon receipt of a notice of non-compliance, the Contractor must propose corrective measures to Government Representative and must implement them with the approval of the Government Representative.
  - .1 Contractor must wait for the written approval of Government Representative before proceeding with the implementation of the proposed measures..
- .3 Government Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions will be granted or equitable adjustments allowed to Contractor for such suspensions.
- .5 The costs of delays resulting from this stop will be the responsibility of the Contractor. The Contractor is responsible for ensuring compliance with environmental requirements for his employees, subcontractors, suppliers and any other entity under its responsibility.

**Part 2 Products**

**2.1 MATERIAL**

- .1 Keep machinery in operation only during use, except in extreme temperatures to prevent shutdown.

**Part 3 Execution**

**3.1 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Final Cleaning: Remove surplus materials, rubbish, tools, and equipment from site, in accordance with Section 01 74 00 - *Cleaning*.
- .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**



Mitigation Measures Table – CL (1524) - Gauron-Lafleur Bridges

Project activities	Environmental components	Description of environmental effects	Impact mitigation measures	Importance of residual effects
1. General planning	<ul style="list-style-type: none"> <li>➤ Fauna</li> <li>➤ Flora</li> </ul>	<ul style="list-style-type: none"> <li>• Disturbance of wildlife and its habitat</li> </ul>	<ol style="list-style-type: none"> <li>1.1 Ensure all workers review mitigation measures and site-specific considerations prior to commencing work.</li> <li>1.2 Present a mobilization plan that defines, on an already disturbed parcel (e.g. road, gravel surface), the access roads to the site as well as the various areas necessary for the project such as the work area, 'muster area, storage area, machinery cleaning area, parking lots and specify the duration of use. These areas must have been approved by the Parks Canada Representative.</li> <li>1.3 Avoid sensitive elements (wildlife, flora, cultural resources) and any associated restricted activity areas designated by Parks Canada. If other sensitive elements are found, stop work immediately and notify the Parks Canada Representative to determine next steps.</li> <li>1.4 If animals are observed in or near the site, ensure an adequate and safe exit from the areas of potential conflict / accident and report any observations to the Parks Canada Representative to ensure compliance with the requirements. legislative requirements related to species at risk.</li> <li>1.5 Do not set traps, harass, feed, bait, lure, poison or kill animals on the site.</li> <li>1.6 If nests, dens, dormitories, hibernacula or calving grounds are discovered, suspend work and contact Parks Canada designated personnel immediately for instructions.</li> </ol>	Negligible and localized residual impact
	<ul style="list-style-type: none"> <li>➤ Experience and visitor safety</li> <li>➤ Worker safety</li> </ul>	<ul style="list-style-type: none"> <li>• Increased ambient noise level</li> <li>• Dangers for visitors and staff</li> </ul>	<ol style="list-style-type: none"> <li>1.7 Identify key contacts and their respective roles and responsibilities prior to undertaking the work and provide information to all on-site workers.</li> <li>1.8 Comply with all laws, regulations, standards, codes and good practices relating to the health and safety of the public, noise and other risks related to work components.</li> <li>1.9 Choose equipment adapted to the nature of the work to be performed. For example, avoid using heavy machinery if hand tools are suitable.</li> <li>1.10 Minimize, if possible, encroachment on the channel track.</li> <li>1.11 Stop machinery engines, tools and noisy equipment during work breaks or breaks.</li> <li>1.12 Develop and implement a detour plan for the runway if it encroaches on the runway.</li> <li>1.13 Take appropriate precautions in case of work where any activity requiring the presence of workers in the area where ragweed is present.</li> </ol>	None once work is complete
2. Mobilization and demobilisation	<ul style="list-style-type: none"> <li>➤ Water and soils quality</li> <li>➤ Human health</li> <li>➤ Flora</li> <li>➤ Fauna</li> <li>➤ Aquatic resources</li> </ul>	<ul style="list-style-type: none"> <li>• Contaminant intake in soil and water</li> <li>• Damage to the root system, branches, and tree bark due to the movement of machinery</li> <li>• Destruction or modification of habitat.</li> <li>• Mortality caused by project activities</li> </ul>	<p><i>Measure 1.2</i></p> <p><b>Protection of the aquatic environment</b></p> <ol style="list-style-type: none"> <li>2.1 Put in place effective measures to limit sediment and debris input from the construction site to the aquatic environment (e.g. sediment barrier, berms, sediment trap, sedimentation basin, temporary stabilization of embankments, diversion of water towards the aquatic environment). areas of vegetation). The measures must remain effective during the temporary closure of the site and during heavy rains. Pay attention to limit the movement of particles in the water when removing the installations.</li> <li>2.2 All erosion control and sediment control structures must be in place prior to commencing work.</li> <li>2.3 Intercept stormwater from outside the construction site and keep these waters off the job site by transporting them to stabilized facilities or locations.</li> <li>2.4 Precipitation and runoff water in work areas must be contained and sampled. If they exceed the standards in force, they must be treated. If there is no risk of contamination at the work site, precipitation and runoff water must be diverted to land in a buffer zone for infiltration, far from the water body and bare soil, or directed to a sedimentation basin or filtration structure to reduce particulate inputs to the channel. The standard outlet discharge standard for suspended solids, as the maximum allowable release concentration, is 25 mg / L. This concentration is added to the background content.</li> <li>2.5 Obtain permission from the Parks Canada Representative before proceeding with any release of water to the environment.</li> <li>2.6 Do not dispose of excavated material, material, waste or debris in the aquatic environment. Remove any debris accidentally introduced into the aquatic environment as soon as possible.</li> <li>2.7 Ensure that no deleterious substances are submerged or released into the aquatic environment or disposed of at a point that could contaminate the aquatic environment as required by the Fisheries Act and the Birds Convention Act, 1994 migratory.</li> </ol>	Negligible and localized residual impact

Project activities	Environmental components	Description of environmental effects	Impact mitigation measures	Importance of residual effects
			<p>2.8 No snow removed during snow clearing may be disposed of in a canal in accordance with the Historic Canals Regulations.</p> <p>2.9 Use retention tanks (110% capacity) or waterproof fuel mats with a berm for stationary equipment and machinery (generators, compressors, etc.) located on the shore and inspect installations during to avoid overflowing.</p> <p>2.10 Mobile toilets should be installed away from storm sewer systems, environmentally sensitive areas (trees, canal, etc.) and paved roads. Make sure they are well anchored to the ground.</p> <p><b>Trees and shrubs</b></p> <p>2.11 Establish and delimit a protective area around trees and shrubs to be preserved (e.g. fence, ribbons, barriers, etc.) so as not to damage them or affect the root system. If this is not possible, install a protection system for the trunks and the root system (wooden planks, non-compacting material with geotextile, etc.). In no case can a tree be used as a support.</p> <p>2.12 In the case where trees are damaged during the work, provide a report from a forest engineer including an assessment of the survival potential of the affected trees. If tree survival is affected by the damage, it must be replaced as directed by the Parks Canada Representative.</p> <p>2.13 No trees may be felled without the permission of the Parks Canada Representative.</p> <p>2.14 If the roots of a tree to be protected must be cut during the work, implement the following measures:</p> <ul style="list-style-type: none"> <li>- Cut the roots using a concrete saw (15 cm) and perform a gradual stripping where roots are or may be present;</li> <li>- Use a geotextile to cover the exposed roots;</li> <li>- Water the affected trees regularly and abundantly during the work;</li> <li>- Restore crown / root balance, based on percentage of loss of the root system, performing compensatory pruning where the same percentage of branches is removed, prioritizing diseased, harmful, weak and / or misplaced branches;</li> <li>- At the end of the work, the ground level must be the same as the one before the work.</li> </ul> <p>2.15 Branches susceptible to damage must be protected or pruned.</p> <p>2.16 Do not paint, damage or mark natural features (e.g., rocks, trees) on site and in the vicinity for survey or other purposes prior to Parks Canada's prior approval..</p> <p>2.17 Branches and other recovered materials must be transported to a storage site without spreading debris and without damaging standing trees or landscape features outside the boundaries of the work.</p>	
	➤ Sound level	<ul style="list-style-type: none"> <li>• Increased ambient noise level</li> </ul>	<p>2.18 <i>Measure 1.11</i></p> <p>2.19 Comply with municipal by-laws concerning noise and work schedules.</p> <p>2.20 Manage the site so as to minimize work that generates significant noise activities.</p> <p>2.21 Whenever possible, plan noisy activities in order to minimize the impact on visitors, especially around residential areas and high traffic areas.</p> <p>2.22 Install noise barriers for equipment generating constant noise (ex. generator, etc.).</p>	None once work is complete
	➤ Navigation	<ul style="list-style-type: none"> <li>• Disruption of nautical activities</li> </ul>	<p>2.23 Comply with the conditions of the approval issued under the Canadian Navigable Waters Act (CNWA). The requirements and mitigation measures recommended by Transport Canada may include signage to be put in place..</p> <p>2.24 Ensure the free passage of boats in the lock during the navigation season, from the Friday preceding Queen's Day to Thanksgiving Monday.</p>	None once work is complete

Project activities	Environmental components	Description of environmental effects	Impact mitigation measures	Importance of residual effects
3. Circulation of machinery	<ul style="list-style-type: none"> <li>➤ Air quality</li> <li>➤ Soils quality</li> <li>➤ Water quality</li> <li>➤ Human health</li> </ul>	<ul style="list-style-type: none"> <li>• Emission of greenhouse gases and fine particles in the air (dust)</li> <li>• Soil compaction and rutting</li> <li>• Erosion and sedimentation</li> </ul>	<p><i>Measures 1.2, 1.8, 1.10, 4.1 and 4.4.</i></p> <p>3.1 Advocate the mobilization / circulation of vehicles on durable or already disturbed surfaces (e.g. paved road, gravel surface, high-resilience disturbed area) and avoid the area of the root system of trees (minimally the ground projection area of the branches).</p> <p>3.2 Maintain and maintain vehicles and construction equipment on a regular basis. Repair immediately or remove from the site any vehicles or equipment that leaks.</p> <p>3.3 When the work includes soil disturbance, avoid sediment erosion by installing the appropriate control structure (e.g. sediment barriers throughout the perimeter) by analyzing the water drainage on the site.</p> <p><b>Air quality</b></p> <p>3.4 Ensure exhaust and pollution control systems for machinery, equipment and other construction equipment are maintained in good condition.</p> <p>3.5 Comply with current municipal regulations regarding dust emissions into the air.</p> <p>3.6 Avoid handling and transporting materials that can easily be eroded or when a plume of dust is visible.</p> <p>3.7 Dump trucks carrying materials (floors, concrete, granular materials and any other type of material) shall be provided with waterproof tarpaulins.</p> <p>3.8 Put in place appropriate measures to reduce dust emissions into the air (e.g. watering of dry materials, sweeping, use of tarpaulins, etc.).</p>	Negligible and localized residual impact
4. Storage of materials and hazardous materials Use, refueling and cleaning of machinery	<ul style="list-style-type: none"> <li>➤ Soils and water quality</li> <li>➤ Human health</li> <li>➤ Archaeological resources</li> </ul>	<ul style="list-style-type: none"> <li>• Contamination of soils with hazardous materials (HAZMAT), waste and hydrocarbon leakage by machinery</li> <li>• Cross-contamination</li> <li>• Sedimentation causing turbidity</li> <li>• Exposure of soil promoting the intrusion of contaminants</li> <li>• Soil erosion, topsoil loss and subsoil exposure</li> <li>• Introduction or dispersal of invasive alien species</li> </ul>	<p><i>Measures 1.2, 2.6, 2.7 and 2.9.</i></p> <p>4.1 Ensure that the machinery is clean and free of invasive species and weeds when arriving at the site and maintain this condition thereafter. At the end of the work, thoroughly clean machinery that has come into contact with invasive alien species to avoid dispersal into new areas.</p> <p><b>Storage</b></p> <p>4.2 Avoid storing in areas with milkweed plants. The plants must be protected from the beginning of May to the end of October, or until the first frost.</p> <p>4.3 Limit storage areas to durable or previously disturbed surfaces. If this is not possible, the proposed storage areas must have been approved by Parks Canada. Equipment and machinery can not be stored above the root system of trees.</p> <p>4.4 Limit vehicle access routes and mobilization areas to existing roads and parking lots and other disturbed areas. A parking lot location plan for heavy machinery and a plan for the location of container storage areas and / or demolition debris are required. If undisturbed areas are to be used, install soil protection measures (e.g. placement of a geotextile fabric and wood chips or gravel). Protective measures should prevent rutting, especially when soils are saturated with water.</p> <p>4.5 Comply with all laws, regulations, standards and preventive health and safety measures pertaining to lockout, storage, display, communication, maintenance of the storage area, handling and maintenance. specific provisions for hazardous materials on site.</p> <p>4.6 Store, maintain and refuel machinery and equipment (compressor, heater, generator, etc.) on a flat surface, outside the periphery of the tree foliage and as far away from the canal as possible.</p> <p>4.7 Provide all construction sites with suitable container for the safe and temporary storage of hazardous waste, which should be separated into categories.</p> <p>4.8 Store petrochemicals, paints and chemicals at maximum distance from the canal and store in a secure lockable place overnight in a Parks Canada approved facility.</p>	Negligible and localized residual impact

Project activities	Environmental components	Description of environmental effects	Impact mitigation measures	Importance of residual effects
			<p><b>Hydrocarbons</b></p> <p>4.9 The storage of petroleum products and hazardous materials, as well as the maintenance, refueling and cleaning of machinery and equipment, must be carried out as far as possible from the water body, on a site set up for this purpose where there is no risk of contamination of soil and groundwater and surface water. If it is not possible to maintain a distance of at least 30 meters, the surface of this site must be impervious and have the capacity to contain at least 110% of the tank volume in case of spills or leaks.</p> <p>4.10 Maintenance, refueling and cleaning of machinery and equipment must be carried out under constant surveillance. The location of the cleaning and refueling areas must be approved in advance by the Departmental Representative.</p> <p>4.11 Clean up leaks and spills during refueling and properly dispose of contaminated material. Never dispose of or dispose of fuel in the environment or in any body of water.</p> <p>4.12 Do not leave any vehicle, machinery and / or gasoline equipment within 10 m of the canal outside working hours or during prolonged site closures. If this is not possible, soil protection measures must be provided under the equipment or machinery for the entire period mentioned above (e.g. containment tank with a volume equivalent to at least 110% of the fuel tank volume of the tank). equipment or machinery)</p> <p>4.13 Clean tools and equipment off site. If it is necessary to do this on site, the cleaning must be done at a location as far as possible from the water.</p> <p>4.14 Use a biodegradable vegetable oil hydraulic system for all machinery that travels in and out of the water.</p> <p>4.15 Provide sufficient quantity of hydrocarbon recovery kits (containment bundles, absorbent rolls, watertight containers, etc.) and a fire extinguisher compliant with the standards in force to manage any spill, environmental incident or fire. Contaminants must be collected at source and disposed of in accordance with applicable laws, policies and regulations. Ensure that workers are trained to respond quickly to leaks or spills and that they know the location of equipment.</p> <p>4.16 Prepare a spill, environmental incident or fire emergency procedure and communication plan. This plan must include, but not be limited to, measures to close leaks as quickly as possible, contain spills to limit their extent, decontaminate areas affected by the spill to counter infiltration at depth.</p> <p>4.17 In the event of an environmental incident, notify Parks Canada, Environment Canada's Emergency Department (1-866-283-2323) and any other authority having jurisdiction over environmental emergencies.</p>	Negligible and localized residual impact
5. Excavation and backfilling	<ul style="list-style-type: none"> <li>➤ Water quality</li> <li>➤ Soils quality</li> <li>➤ Fauna and flora</li> <li>➤ Archaeological resources</li> </ul>	<ul style="list-style-type: none"> <li>• Erosion and sedimentation</li> <li>• Introduction or dispersal of invasive alien species</li> <li>• Habitat modification</li> <li>• Supply of contaminated substances into the environment</li> <li>• Cross-contamination</li> <li>• Damage to archaeological remains and resources during excavations</li> </ul>	<p><i>Measures 2.1, 2.6 and 2.7.</i></p> <p>5.1 Avoid excavation during periods of saturated soil, heavy rain, runoff, strong winds, or wet snow.</p> <p>5.2 Limit in situ storage time of excavated material.</p> <p>5.3 Any temporary pile-up of unconsolidated material located within 30 m of an aquatic environment and left in place for a period of more than 24 hours must be protected with a sediment barrier and covered with a cloth tight to prevent the transport of sediments in the water.</p> <p>5.4 Use clean backfill material free of contaminants and unwanted species.</p> <p>5.5 Any soil imported on the Parks Canada property must be a cropland that meets the latest standards of the Ville de Montréal and the Bureau de Normalisation du Québec</p> <p><b>Cultural and Heritage Resources</b></p> <p>5.6 Comply with all specific requirements established by Parks Canada for archaeological monitoring.</p> <p>5.7 If archaeological monitoring is not required for the works and archaeological remains (remains of construction or development, objects and fragments of objects) are discovered incidentally during excavations, suspend work in the immediate area of discovery and notify the Parks Canada Representative. The contractor must ensure that the archaeological remains are preserved and protected until an archaeologist evaluates them and indicates what action to take..</p>	

Project activities	Environmental components	Description of environmental effects	Impact mitigation measures	Importance of residual effects
			<p><b>Contaminated soils</b></p> <p>5.8 Manage cuttings (storage and disposal) according to their nature (e.g. topsoil, backfill), their volume and the extent of their contamination (e.g. generic criteria, recommendations) according to federal laws and regulations provincial and municipal policies.</p> <p>5.9 Take the necessary precautions during the temporary storage of the cuttings in order to control the dispersion of the fine elements and to avoid contamination of the underlying and adjacent soils. Forecast minimally of:</p> <ul style="list-style-type: none"> <li>- segregate the cuttings according to their nature and level of contamination;</li> <li>- Store the cuttings on an impervious sheet and cover them with canvases fixed firmly to prevent them from being lifted by the wind;</li> <li>- Install sediment barriers so as to surround the different areas of storage of the cuttings;</li> <li>- At all times, ensure that soils do not migrate to other locations, either by air, runoff or vehicle transit.</li> </ul> <p>5.10 Do not store contaminated materials excavated near the water. If the land does not permit on-site storage, plan the excavation taking into account the opening hours of the disposal sites.</p> <p>5.11 If necessary, perform a characterization of excess excavated material to determine the degree of contamination and adequately manage their disposal.</p> <p>5.12 All machinery that comes into contact with contaminated equipment should be properly cleaned before being used in other areas.</p> <p>5.13 When disposing of soil off-site, keep any document or slip showing their disposal in sites authorized by the MELCC according to their degree of contamination.</p>	Negligible and localized residual impact
6. Concrete demolition and concreting Removal and placement of asphalt pavement	<ul style="list-style-type: none"> <li>➤ Air quality</li> <li>➤ Human health</li> <li>➤ Visitor experience</li> </ul>	<ul style="list-style-type: none"> <li>• Emission of greenhouse gases</li> <li>• Increased ambient noise level</li> </ul>	<p><i>Measures 2.18 à 2.22, 3.4 to 3.8</i></p> <p>6.1 Comply with Environment Canada and Climate Change Canada's (ECCC) Code of Practice for the Reduction of Volatile Organic Compounds from Fluidized Bitumen and Emulsion.</p> <p>6.2 Where possible, use bituminous mixes from recycled bituminous aggregates and cold or warm manufacturing processes, for example, to reduce greenhouse gas emissions and save energy.</p> <p>6.3 Use products with low volatile organic compound (VOC) emissions (e.g. bitumen emulsion rather than fluidized bitumen).</p>	Negligible and localized residual impact
	<ul style="list-style-type: none"> <li>➤ Soils quality</li> <li>➤ Water quality</li> </ul>	<ul style="list-style-type: none"> <li>• Supply of construction debris and demolition</li> <li>• Degradation of soil quality</li> </ul>	<p><i>Measures 2.1, 2.6 and 2.7.</i></p> <p>6.4 Provide measures to recover all debris and residues resulting from the demolition of concrete and the preparation of concrete components (e.g. tarpaulin, geotextile, shelter, etc.).</p> <p>6.5 Clean construction debris as and when required and dispose of it at sites authorized by the MELCC.</p> <p>6.6 Excess concrete from concrete pumps must be poured into a confined and sealed enclosure. After curing, the concrete residues must be managed with the construction waste and disposed of in an approved facility.</p> <p>6.7 Mix the concrete on tarpaulins as far as possible from the channel. Avoid fresh, wet, uncured cement and concrete dust coming into contact with water bodies.</p> <p>6.8 The concrete mixer wash water and the curing water must be collected in a watertight basin designed to prevent any discharge into the environment.</p> <p>6.9 The wash water may be taken in charge by the concrete supplier and returned to the concrete plant for disposal. If not, these waters must be contained, sampled and processed.</p>	Negligible and localized residual impact



Project activities	Environmental components	Description of environmental effects	Impact mitigation measures	Importance of residual effects
<p>7. Cleaning / stripping surfaces (sandblast) painting the structure and applying coatings</p>	<ul style="list-style-type: none"> <li>➤ Air quality</li> <li>➤ Water quality</li> <li>➤ Soils quality</li> <li>➤ Fauna and flora</li> <li>➤ Human health</li> </ul>	<ul style="list-style-type: none"> <li>• Emission of particles in the air (dust, particles of silica and lead)</li> <li>• Supply of construction debris and demolition</li> <li>• Soils contamination</li> <li>• Degradation of water quality by contamination and sediment</li> <li>• Poisoning of workers exposed to silica and lead particles</li> </ul>	<p><i>Measures 2.1, 2.6 and 2.7.</i></p> <p><b>Paint et coating</b></p> <p>Put in place protective measures to prevent dispersion of paint particles or other coatings, for example:</p> <ul style="list-style-type: none"> <li>- Avoid periods of high winds;</li> <li>- Adjust the flow of the gun correctly;</li> <li>- Use shield to minimize overspray losses</li> </ul> <p>7.2 Use plastic covering to collect and contain drops, spills and paint fumes.</p> <p>7.3 Use tarpaulins to transfer paint or other application products from storage and mixing containers to appliances or application containers. Use secondary containment containers with a minimum capacity equivalent to 110% of the container volume containing the paint to minimize the risk of spillage.</p> <p>7.4 Clean paint equipment in a place approved by Parks Canada; prevent the washing water from entering a body of water.</p> <p>7.5 Dispose of all paint and paint-solvent solutions in accordance with applicable federal, provincial and municipal laws.</p> <p>7.6 Use products that have the least adverse effects on the environment and ensure their environmental compliance. Do not use products containing banned substances under the Canadian Environmental Protection Act and its regulations.</p> <p><b>Residues of paint and sandblasting</b></p> <p>7.7 Metallic elements containing lead paint to be disposed of shall be disposed of in a technical landfill based on the criteria for the current solid lead content.</p> <p>7.8 Sandblasting or paint stripping residues containing lead shall be subjected to a leaching test to determine if they are considered hazardous materials.</p> <p>7.9 Treat silica sandblasting and lead paint residues (which exceed the applicable criteria for leaching tests) as Residual Hazardous Substances (MDRs) as stipulated in the Hazardous Materials Regulations. Put in place the appropriate measures to:</p> <ul style="list-style-type: none"> <li>- Recover all sand and paint residues.</li> <li>- Store the residues hermetically.</li> <li>- Dispose of residues in the sites authorized by the MELCC.</li> </ul> <p>7.10 Provide adequate containment and recovery measures to minimize the release of contaminants into the air and soils (sandblasting, seal cleaning and other residues). For example, installing a shelter and a tarpaulin to retain sandblasting particles and paint residue generated by cleaning. The shelter shall provide imperviousness to prevent leaching in the event of rain and a ground catching mechanism to prevent rejection in the canal.</p> <p>7.11 Respect the allowable levels specified in the regulations in force for the silica content in the sanding abrasive used for the cleaning of reinforcing steel and concrete surfaces.</p> <p>7.12 Whenever possible, use an abrasive with less impact than silica, e.g. olivine.</p> <p>7.13 Refer to the Règlement sur la qualité du milieu de travail, S-2.1, r. 11 and the Règlement sur la qualité du milieu de travail, S-2.1, r. 13.</p> <p>7.14 Use adequate personal protection based on dust exposure values (mask, gloves, goggles, etc.) based on exposure values for lead, silica and dust.</p>	<p>Negligible and localized residual impact</p>

Project activities	Environmental components	Description of environmental effects	Impact mitigation measures	Importance of residual effects
<p>8. Off-site waste management and disposal: (building materials, hazardous materials, cleaning waters, etc.)</p>	<ul style="list-style-type: none"> <li>➤ Water, soils and air quality</li> <li>➤ Fauna and flora</li> </ul>	<ul style="list-style-type: none"> <li>• Modification of the wildlife and flora habitat</li> <li>• Contamination of air, water and soil by cleaning residues, waste and residual hazardous materials</li> </ul>	<p><i>Measures 2.3 to 2.8, 2.17, 4.4, 4.5, 4.7, 4.11, 4.15, 6.4 to 6.6, 6.9, 7.6, 7.8 and 7.10.</i></p> <p><b>Cleaning water</b></p> <p>8.1 Ensure that wastewater generated during construction is contained and recovered. If a treatment system (portable sedimentation pond, filters or other such facilities) is to be used, it must prevent contaminants and particles that may settle in the systems and run off to the sewer. Use the necessary means to define the method of disposal of collected sediment, wastewater, and to ensure compliance with applicable discharge standards, such as CMM 2008-47 Sewer Discharge Regulations. It will be the responsibility of the contractor to demonstrate compliance with these standards.</p> <p>8.2 If the waters do not comply with the applicable standards and can not be treated on site, they must be collected in sealed containers and transported to a place authorized by the MELCC.</p> <p>8.3 Canal water may not be used to wash equipment or other site operations without the prior permission of the Parks Canada Representative.</p> <p><b>Residual hazardous materials and non-hazardous residual materials</b></p> <p>8.4 Store in a vehicle, secure building or wildlife-proof containers all products that are likely to attract animals (e.g., petroleum products, food, beverage containers and waste). If possible, keep food waste separate from construction debris and dispose of it daily.</p> <p>8.5 List and sort all hazardous or toxic substances (asphalt shingles, concrete debris, creosote treated wood, asbestos, lead paint, mold, animal excrement, paint, automotive products, electrical equipment) and all pollutants like gasoline and solvents on the job site. Handle, store and dispose of in accordance with the Canadian Environmental Protection Act (CEPA), the Transportation of Dangerous Goods Act, 1992, WHMIS and all other applicable laws, regulations and standards.</p> <p>8.6 Confining and stabilizing non-hazardous residual material at the widest possible distance from the canal and the storage area designated and approved in Measure 1.2.</p> <p>8.7 Eliminate off-site all non-hazardous residual materials and provide sufficient containers to store household waste on a daily basis.</p> <p>8.8 Recover solid wastes from washing of construction equipment and dispose of them appropriately.</p> <p>8.9 Regularly maintain portable sanitary facilities and dispose of accumulated waste in an appropriate disposal facility. Portable facilities must have sufficient capacity and be managed to prevent waste from being released into the receiving environment.</p> <p>8.10 Do not burn, burn or bury construction waste, hazardous substances or any material (e.g. plastic).</p>	<p>Negligible and localized residual impact</p>
<p>9. Restoration of the site after the demobilization</p>	<ul style="list-style-type: none"> <li>➤ Water quality</li> <li>➤ Soils quality</li> <li>➤ Fauna and flora</li> </ul>	<ul style="list-style-type: none"> <li>• Erosion and sedimentation</li> <li>• Introduction of invasive alien species</li> </ul>	<p>9.1 Rehabilitation of damage to vegetation, natural features and wildlife, if any, shall be carried out under the supervision of a qualified specialist.</p> <p>9.2 Disturbed soils, exposed areas, vegetated surfaces and all disturbed floristic elements during the work must be rehabilitated, revegetated or replaced promptly following the completion of the work by methods approved by the Parks Canada Representative to ensure that the site left as it is.</p> <p>9.3 Rehabilitated surfaces must have a degree of compaction and aeration corresponding to the initial state (pre-works).</p> <p>9.4 Provide good runoff drainage, which may include restoring or improving original drainage conditions.</p>	<p>Negligible and localized residual impact</p>

Company logo

# Project Name

Location

Environmental protection plan (EPP)

Project #

Date

Contractor name



## Contents

Document modifications follow-up .....	2
EPP Objective .....	2
Environmental Protection Plan (EPP).....	3
1. Contact Information.....	3
2. Worker awareness of EPP.....	3
3. Environmental Regulatory Framework.....	4
4. Erosion and sedimentation control.....	4
5. Procedure for refueling and maintenance of equipment .....	5
6. Wastewater, Stormwater and Pump Water Management Plan .....	5
7. Excavated soil management plan.....	6
8. Vegetation protection.....	6
9. Residual Materials and Hazardous Materials Management Plan .....	7
10. Protection of wildlife.....	8
11. Protection of aquatic environments.....	8
12. Dust and emission control.....	8
13. Noise control .....	8
14. Modalities of restoration of the site at the end of the works .....	8
15. Emergency Response and Environmental Prevention .....	9
Appendix 1. Mobilization plan .....	9
Appendix 2. Environmental surveillance plan.....	10
Additional Appendix.....	10

## **Document modifications follow-up**

Modification number	Date	Author(s)	Brief modification description
1.0	[yyyy-mm-dd]	[Name of author]	Document Creation.

## **EPP Objective**

An Environmental Protection Plan (EPP) is a document that describes site-specific environmental protection measures and responsibilities during the implementation of a project. An EPP is designed to ensure that the environmental mitigation commitments and measures outlined in the specifications are properly understood and implemented by the Contractor. The EPP must contain specific and direct guidelines to achieve the targeted environmental outcomes in the mitigation measures.

The "ENVIRONMENTAL PROTECTION" section of the quotation contains a non-exhaustive list of indications on the EPP. This list may include, for example, the following:

- The Contractor must submit an Environmental Protection Plan to the Government Representative for review and approval prior to the commencement of construction activities or the delivery of materials and equipment to the site;
- The plan should provide a comprehensive overview of known or potential environmental problems to be addressed during construction and of applicable safeguards to mitigate environmental impacts;
- The actions included in the environmental protection plan must be presented per a level of detail which agrees with the environmental problems and with the construction work to be carried out.

# Environmental Protection Plan (EPP)

\*Please insert a nomenclature into a subsection, ex 1.1, 1.2, 1.3, etc.

## **1. Contact Information**

*The objective of this section is to identify the persons responsible for the implementation of the EPP.*

The "ENVIRONMENTAL PROTECTION" section of the specifications contain a non-exhaustive list of the elements to be contained in an EPP. This list may include, for example, the following:

- The names of the persons responsible for ensuring compliance with the plan;
- The names and skills of the persons responsible for the exit signs for residual hazardous materials to be evacuated from the site.

Specifically, this section should include, but is not limited to:

- The name and contact information of the Contractor's representative responsible for the implementation of the EPP;
- The names of Parks Canada staff involved in the environmental component of the project;
- The names of other project contacts with key environmental responsibilities;
- Environmental responsibility of each stakeholder;
- An organizational chart of the Contractor and the communication chain.

## **2. Worker awareness of EPP**

*The objective of this section is to describe the Entrepreneur's strategy to ensure that its staff is aware of the content of the EPP, is aware of the environmental issues at the site of work and is adequately trained in the implementation of the EPP.*

The "ENVIRONMENTAL PROTECTION" section of the specifications contain a non-exhaustive list of the elements to be contained in an EPP. This list may include, for example, the following:

- The names and qualifications of the persons responsible for the training of construction site personnel;
- A description of the training program for personnel assigned to the protection of the environment.

Specifically, this section should include, but is not limited to:

- Strategy for training workers prior to work;
- The EPP communication strategy for workers, for example:
  - o Review of environmental issues and measures at start-up and construction meetings;
  - o Discussion of the environmental aspect in daily work planning meetings

### **3. Environmental Regulatory Framework**

*Include in this section a list of environmental notices, permits, approvals and approvals received prior to construction. A copy of these documents must be at all times at the site.*

*The main environmental restrictions and requirements outlined in these documents are to be found in this section.*

*Any other regulatory compliance measures affecting or restricting the construction project (e.g. critical periods for wildlife protection) should also be included in this section.*

### **4. Erosion and sedimentation control**

*The purpose of this section is to develop an erosion and sediment control plan for all periods of construction and reclamation. This plan must be adapted to the scope of the project and the associated risks. The plan must define concretely the means and techniques used to control the sediments and the location of the facilities.*

*The "ENVIRONMENTAL PROTECTION" section of the specifications contains a non-exhaustive list of the elements to be contained in an EPP. This list may include, for example, the following:*

- *A plan for the prevention of erosion and sediment transport, indicating the measures to be implemented, including monitoring of work and reporting to verify compliance with federal laws and regulations, Provincial and municipal governments.*
- *Traffic control plans, including measures to reduce the erosion of temporary road platforms by the movement of construction vehicles, particularly in rainy weather. These plans must include measures to reduce the transport of materials on public roads by vehicles or runoff.*

Specifically, this section should include, but is not limited to:

- Identification of areas at risk (ex watercourses, wetlands, steep slopes, etc.);
- Erosion prevention procedures (ex timing of project implementation, minimization of site area to the minimum required, management of the area under construction, land cover measures);

- Sediment control measures (ex sediment barriers, filter berm, sediment traps, etc.), including the usual specifications and drawings of sediment control structures (may be included in the appendix);
- Detailed work plans for aquatic structures, including site isolation and project timelines;
- Water management plans, including on-site controls, equipment, and proposed drainage areas;
- Areas where erosion and sediment control measures are applied (indicate on the plan in Appendix 1);
- Monitoring of control measures, preventive measures, and corrective measures (e.g. repairs);
- Removal of non-biodegradable materials when the area is stabilized.
- Any other requirements specified in the specification and the mitigation table for erosion and sediment control.

## **5. Procedure for refueling and maintenance of equipment**

*The purpose of this section is to identify measures to protect the environment during maintenance and refueling of machinery and equipment. Planned supply areas should be identified on the mobilization plan in Appendix 1.*

## **6. Wastewater, Stormwater and Pump Water Management Plan**

*The purpose of this section is to define on-site water management, including wastewater, storm water inside and outside the site, and pumping water (e.g. drying a work area or keep dry excavations).*

The "ENVIRONMENTAL PROTECTION" section of the specifications contain a non-exhaustive list of the elements to be contained in an EPP. This list may include, for example, the following:

- A run-off and leach management plan, indicating the measures that will be implemented to prevent any discharge of the water coming from the site into the surrounding aquatic environment;
- A wastewater management plan, indicating the methods and procedures to be used for the management or disposal of wastewater directly from construction activities, e.g. water used for concrete curing, Cleaning / discharging, grounding, disinfection, hydrostatic testing and rinsing of pipelines.

More specifically, this section should include, but is not limited to:

- Pre-discharge sites approved by Parks Canada;
- Methods of confinement and recovery of wastewater from the site (e.g. cleaning water from concrete surfaces, cleaning water from concrete pumps, runoff water, etc.);
- Water treatment methods, if required;
- Control of turbidity in the aquatic environment;

- Methods of verifying compliance with applicable quality criteria for water discharged into the aquatic environment;
- Any other requirements specified in the specifications and the mitigation measures table for on-site water management.

## **7. Excavated soil management plan**

*This section is complementary to section 4 on erosion and sediment control. It aims to detail temporary storage measures for excavated soil during the work, contaminated soil management methods, where appropriate, and protection of the environment during the period of soil disturbance.*

More specifically, this section should include, but is not limited to:

- Temporary storage areas (indicate in the mobilization plan in Appendix 1);
- Methods for stabilizing slopes and disturbed soils;
- Methods for managing soils during temporary storage (excavated soil to be reused and soils disposed off-site);
- The name of the center (s) to which the contaminated soil will be sent, if applicable;
- Details on the concrete implementation of the measures specified in the specifications for contaminated soil management, where applicable;
- Any other requirements specified in the specification and the mitigation table for soil and excavation management.

## **8. Vegetation protection**

*The objective of this section is to indicate the means that will be put in place to protect the vegetation on the site and outside the site near taxiways and access roads, to plan for the management of undesirable species, and specify the trees and shrubs to be felled or pruned for the purposes of the work. Any intervention on vegetation must be validated and authorized by Parks Canada.*

More specifically, this section should include, but is not limited to:

- Measures to manage irritant species and invasive alien species (ex, phragmite), including methods of cleaning machinery and means of disposing of plant residues;
- Measures to protect trees and shrubs against damage and disturbance caused by the work;
- Identification and location of trees to be felled and pruned, previously approved by Parks Canada;

- If required, a pesticide treatment plan approved by the Parks Canada process;
- Any other requirements specified in the specification and the mitigation table for vegetation management.

## **9. Residual Materials and Hazardous Materials Management Plan**

*Indicate in this section waste management measures, including hazardous and non-hazardous residual materials. This section should also include measures for the storage and handling of hazardous materials used on site.*

The "CONSTRUCTION WASTE / DEMOLITION MANAGEMENT AND DISPOSAL" section of the specifications contain a non-exhaustive list of waste management and waste reduction measures. This list may include, for example, the following:

- Before starting work, meet with the Government Representative to review the waste management objectives and waste reduction plan for the construction, renovation and demolition (CRD) waste generated by the project.
- The waste management objective is to reduce as much as possible the total flow of construction / demolition waste to landfills.
- Provide the Government Representative with documents certifying that comprehensive measures and procedures for waste management, recycling, reuse / reuse of recyclable and reusable / re-employable materials have been implemented.
- Minimize the amount of non-hazardous solid waste generated by the work; Maximize the reduction at source, reuse / reuse and recycling of solid waste produced by CRD activities.

The "ENVIRONMENTAL PROTECTION" section of the specifications contains a non-exhaustive list of the elements to be contained in an EPP. This list may include, for example, the following:

- A plan for the disposal of non-hazardous residual materials, hazardous or special residual materials including methods and sites for the disposal of solid waste and debris from clearing.
- A plan for the prevention of contamination indicating the potentially hazardous substances to be used on the site, measures to prevent the substances being suspended in the air or introduced into the soil, as well as the details of the measurements that will be taken to ensure that the storage and handling of these substances are in compliance with federal, provincial and municipal laws and regulations.

This section should include, but is not limited to:

- Waste management measures, including hazardous and non-hazardous waste;
- Measures for the storage and handling of hazardous materials used on site;
- Container and hazardous material shelter locations (indicate in the mobilization plan in Appendix 1);
- The procedure for the management and disposal of concrete surplus from concrete pumps;
- Any other requirements specified in the specification and the mitigation measures table for the management of residual materials and hazardous materials.

## **10. Protection of wildlife**

*Indicate in this section the requirements specified in the specifications and the table of mitigation measures to protect terrestrial, aquatic, and avian wildlife.*

## **11. Protection of aquatic environments**

*The purpose of this section is to identify the means to meet the requirements of the specifications and the mitigation table to protect aquatic environments (rivers, canals, wetlands, etc.). Among other things, indicate ways of preventing the dispersal of invasive exotic species (e.g. zebra mussels).*

## **12. Dust and emission control**

*Indicate in this section the requirements specified in the specification and the table of mitigation measures that aim to minimize emissions of fine particulate matter and greenhouse gases into the air.*

The "ENVIRONMENTAL PROTECTION" section of the specifications contain a non-exhaustive list of the elements to be contained in an EPP. This list may include, for example, the following:

- A plan for the prevention of air pollution, specifying measures to retain dust, debris, materials and residual materials inside the site.

## **13. Noise control**

*Indicate in this section the requirements outlined in the quote and the table of mitigation measures to minimize noise and inconvenience to site visitors and area residents as appropriate.*

## **14. Modalities of restoration of the site at the end of the works**



*The objective of this section is to specify the planned restoration measures at the end of the work.*

## **15. Emergency Response and Environmental Prevention**

*This section should specify steps for emergency response, particularly in the case of a spill of oil or other hazardous materials.*

The "ENVIRONMENTAL PROTECTION" section of the specifications contains a non-exhaustive list of the elements to be contained in an EPP. This list may include, for example, the following:

- A spill contingency plan that includes procedures to be followed, instructions to be followed and reports to be produced in the event of an unpredictable spill of a controlled substance.

Specifically, this section should include, but is not limited to:

- List of products and materials considered or defined as hazardous or toxic to the environment. These products include, but are not limited to, waterproofing agents, grout, cement, concrete finishing agents, hot-melt rubber membrane materials, bituminous cement, sand blasting agents, paint, solvents, and hydrocarbons;
- Equipment required on site;
- The contents and location of on-site recovery kits;
- Procedures for refueling and storing fuel;
- Spill prevention procedures (containment and storage of materials, safety, handling, use and disposal of empty containers, surplus products or waste generated by the application of these products in accordance with federal and provincial force);
- The spill response procedure (containment, cleaning, disposal of contaminated materials, etc.);
- An Incident Report Form to report spills (if included as an appendix, refer to them here);
- An up-to-date contact list for emergency response (Parks Canada, Environment Canada, Coast Guard, etc.), including information required to report spills.
- A fire emergency response plan;
- Any other requirements specified in the specification and the mitigation measures table for the management of spills and environmental emergencies.

## **Appendix 1. Mobilization plan**

*This schedule must include a plan identifying all elements that can be located in relation to environmental issues and the protection of the environment in the mobilization area and the machinery lanes.*

The "ENVIRONMENTAL PROTECTION" section of the specifications contain a non-exhaustive list of the elements to be contained in an EPP. This list may include, for example, the following:

- Drawings showing the location of temporary excavations or site paths in embankments, materials, constructions, sanitary installations, deposits of surplus materials or contaminated materials; The drawings illustrating the methods that will be used to control runoff and to confine the materials to the site.
- A plan of the work area showing the activities planned in each part of the works area and indicating the areas of restricted use as well as the prohibited areas of use. This plan shall include measures to mark the boundaries of usable areas and methods of protection of the elements within authorized work areas to be preserved.

Specifically, this section should include, but is not limited to:

- Location of trees to be felled and trees to be protected (tree felling must be approved in advance by Parks Canada);
- Excavation areas;
- Temporary lanes and access;
- The location of temporary facilities (e.g. platforms, cofferdams, etc.);
- Storage areas for excavated soils and other stacked materials, where applicable;
- Storage areas for building materials and debris;
- Location of erosion prevention equipment (ex, sediment barrier);
- Location of maintenance and refueling areas for machinery;
- Location of hazardous material shelters and waste containers;
- Location of oil recovery kits;
- The location of the confined enclosure for concrete surplus, where applicable;
- Location of water treatment facilities, where applicable (settling pond, etc.);
- Identified sites for the discharge of water into the environment.
- Etc.

## **Appendix 2. Environmental surveillance plan**

*Include a periodic monitoring report that captures the main measures of each section of the EPP to systematically check on their implementation and their proper functioning.*

### **Additional Appendix**

Add appendix to include the following:

- Material Safety Data Sheets;
- Data sheets on sediment containment methods (ex sediment barrier) or other specific equipment related to the environment used on the site;
- Management of nonconformities;
- Relevant shop drawings and drawings.

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 02 41 13.13 – Paving Removal
- .2        Section 02 41 16 – Structure Demolition
- .3        Section 02 83 12 – Lead Base Paint Abatement – Maximum Precautions
- .4        Section 03 10 00 – Concrete Forming
- .5        Section 03 20 00 – Concrete Reinforcing
- .6        Section 03 30 00 – Cast-in-place Concrete
- .7        Section 03 30 03 – Concrete Repairs
- .8        Section 05 12 33 – Structural Steel for Bridges
- .9        Section 05 50 00 – Metal Fabrication
- .10       Section 07 13 52 – Modified Bituminous Sheet Waterproofing
- .11       Section 09 91 13.23 – Exterior Painting of Structural Steel
- .12       Section 31 05 16 – Aggregates for Earthwork
- .13       Section 32 12 16 – Bituminous Pavement Covering
- .14       Section 32 17 23 – Pavement Marking
- .15       Section 34 71 13.25 – Vehicle W-Beam Guide Rail

**1.2                REFERENCE STANDARDS**

- .1        Guide de contrôle de la qualité des enrobés à chaud (2017); Direction de la gestion des projet routiers; Ministère des Transports, (MTQ).
- .2        Guide de contrôle de la qualité des sols et des granulats (2017); Direction de la gestion des projet routiers; Ministère des Transports, (MTQ).
- .3        Guide de contrôle de la qualité du béton (2017) ; Direction de la gestion des projet routiers; Ministère des Transports, (MTQ).

**1.3                INSPECTION**

- .1        Allow Government Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2        Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Government Representative instructions, or law of Place of Work.
- .3        If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4        Government Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found

not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Government Representative will pay cost of examination and replacement.

- .5 All shop drawings must be stamped and signed by professional engineer registered with the Ordre des ingénieurs du Québec.

#### 1.4 INDEPENDENT INSPECTION AGENCIES

- .1 **The Contractor is responsible for all testing required to comply with the contractual requirement (Concrete, Asphalt, Soils and aggregates).**
- .2 The Park Canada Agency (PCA) will retain the services of independent testing and inspection agency to conduct additional testing (Laboratory). This does not relieve the Contractor from performing the test to meet the contractual requirements and to provide the results and details of his tests.
- .3 Provide equipment required for executing inspection and testing by appointed agencies.
- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Government Representative at no cost to the Government Representative. Pay costs for retesting and reinspection.

#### 1.5 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

#### 1.6 PROCEDURES

- .1 Notify appropriate agency and Government Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- .4 The Contractor must be aware of and follow the quality procedures of the various guides listed under 1.2 *Reference Standards* (Concrete, Asphalt, Soils and aggregates); depending on the work to be done.

#### 1.7 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Government Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of the Government Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by the Government Representative.

#### **1.8 CERTIFICATION**

- .1 When certification is required in the drawings and specifications, the Contractor must provide a copy of the certificate to the Government Representative prior to the beginnings of the work subject to this requirement. The certificate must be valid for the duration of this work.

#### **1.9 CERTIFICATE OF CONFORMITY**

- .1 When a certificate of conformity is required in the drawings and specifications, the Contractor may not use a material for which such certification has not been sent to the Government Representative.
- .2 This certificate of conformity must be signed by the manufacturer of the material. The Certificate of Conformity and the delivery receipts of the material must be written in such a way as to be able to make the link between them. The Contractor must provide the Certificate of Conformity to the Government Representative by the prescribed deadline.
- .3 If the Contractor is unable to provide all the information required in the drawings and specifications, the Contractor must, at its expense, use a registered laboratory to provide the missing information on the Certificate of Conformity. The certificate must be signed by the representative of the laboratory that carried out the tests.

#### **1.10 QUALIFICATION**

- .1 When a qualification is required in the drawings and specifications, the Contractor must provide a copy of the certificate to the Government Representative prior to the beginning of the work subject to this requirement. The certificate must remain valid for the duration of this work.

#### **1.11 REPORTS**

- .1 Submit four (4) copies of inspection and test reports to the Government Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

#### **1.12 TESTS AND MIX DESIGNS**

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by the Government Representative and may be authorized as recoverable.

#### **1.13 MOCK-UPS**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of Sections required to provide mock-ups.

- .2 Construct in locations as specified in specific Section acceptable to the Government Representative.
- .3 Prepare mock-ups for the Government Representative review with reasonable promptness and in orderly sequence, to not cause delays in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Government Representative will assist in preparing schedule fixing dates for preparation.
- .6 Remove mock-up at conclusion of Work or when acceptable to Government Representative.
- .7 Mock-ups may remain as part of Work.
- .8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

**1.14 MILL TESTS**

- .1 Submit mill test certificates as required of specification Sections.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 01 33 00 – *Submittal Procedures*.

**1.2 REFERENCE STANDARDS**

- .1 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB 1.189, latest edition,, Exterior Alkyd Primer for Wood.
  - .2 CGSB 1.59, latest edition,, Alkyd Exterior Gloss Enamel.
- .2 CSA Group (CSA)
  - .1 CSA-A23.1/A23.2, latest edition, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA-0121, latest edition, Douglas Fir Plywood.
  - .3 CAN/CSA-S269.2, latest edition, Access Scaffolding for Construction Purposes.
  - .4 CAN/CSA-Z321, latest edition, Signs and Symbols for the Occupational Environment.
- .3 U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1 EPA 832R, latest edition,, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.

**1.4 INSTALLATION AND REMOVAL**

- .1 The Parks Canada Agency makes a specific area of land available to the Contractor for the development of site facilities (Contractor's site office, Government Representative site office, storage areas). The specific authorized mobilization area is indicated on the map. If the Contractor requires an area greater than the authorized mobilization area, the latter must provide for rentals, agreements, leases and permits with a third party. Parks Canada only authorizes the defined and indicated mobilization area.
- .2 Provide a site facilities and mobilization plan indicating the proposed location and the dimensions of the area to be fenced and used by the Contractor, the number of construction trailers required, the access routes to the fenced area and fence installation details. Construction site fences must be rigid and at least 2440 mm high. They must surround the perimeter of the mobilization area and include the access doors.
- .3 Identify areas which have to be gravelled to prevent tracking of mud.
- .4 Indicate use of supplemental or other staging area.
- .5 Provide, set up or install the site facilities necessary to allow work to be carried out as quickly as possible.



- .6 Dismantle the equipment and evacuate it from the site when it is no longer needed.
- .7 Provide site traffic management plan.

### **1.5 SCAFFOLDING**

- .1 Scaffolding: compliant with CAN / CSA-S269.2 standard.
- .2 Provide scaffolding, access ramps, ladders, flying scaffolding, platforms, temporary stairs, etc., necessary for the execution of the work, and ensure maintenance for the duration of the work.
- .3 The Contractor must provide the Government Representative with access to the work at all times. Access platforms and systems must be kept in place for the duration of the work.
- .4 The components must comply with health and safety requirements.

### **1.6 HOISTING**

- .1 Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
- .2 Hoists and cranes to be operated by qualified operator.

### **1.7 ELEVATORS**

- .1 Not Used.

### **1.8 SITE STORAGE/LOADING**

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.
- .3 Where there are plans to use existing works:
  - .1 Obtain the written authorization of the Parks Canada Agency Project Manager at least ten (10) days before work begins.
  - .2 Check the structural capacity of existing works against the requirements of CAN/CSA-S6 (latest edition), *Canadian Highway Bridge Design Code*, and take into account the various load combinations that cause maximum force on the structural elements of the works.
  - .3 For each piece of equipment used by the Contractor or its Subcontractors, provide Government Representative with itemized design note signed by a competent engineer member of the Ordre des ingénieurs du Québec. The design note must show that the force of the equipment is less than the legal load but without exceeding the work's posted capacity for the double-axle truck.
  - .4 Submit the design note to the Government Representative at least ten (10) days before any equipment circulates on the works in question.
  - .5 Pay all costs for inspection/evaluation of existing works.
  - .6 Use existing works, available according to PCA, in accordance with the authorizations obtained and in accordance with the design note provided.

**1.9 CONSTRUCTION PARKING**

- .1 Parking will not be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .3 Clean bike and pedestrian paths as well as roads where used by Contractor's equipment.

**1.10 SECURITY**

- .1 Provide and pay for responsible security personnel to guard site and contents of site after working hours and during holidays.

**1.11 OFFICES**

- .1 Provide office heated to 22 degrees C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- .4 Government Representative's office.
  - .1 Set up a temporary office with parking within one hundred (100) meters of the latter for the Government Representative and provide two additional parking lots on the days of site meetings.
  - .2 The office must measure, inside, at least 9 m in length x 3 m in width x 2.4 m in height, and include a floor located 0.3 m above the ground, as well as 4 windows opening at 50% and a lockable door.
  - .3 The office must be well insulated and have a heating and / or air conditioning system ensuring an ambient temperature of 22 degrees Celsius.
  - .4 Walls and ceiling must be covered with plywood panels, hard fiber panels or plasterboard, then painted in the colors chosen. The floor must be covered with 19 mm thick plywood panels.
  - .5 The office of the Government Representative must be equipped with a high-speed internet line, including the supply of the modem and the subscription fees to the service provider. All costs are the responsibility of the Contractor.
  - .6 The office of the Government Representative must be equipped with a multifunction printer (print, photocopy and scan) colors with automatic feeder in new condition, letter size (8 ½ x 11 inches), legal (8 ½ x 14 inches) ) and tabloid (11 x 17 inches) including stationery for the duration of the contract (color photocopier required).
  - .7 The office must be equipped with an electric lighting system ensuring a level of lighting of 750 lux; the devices used must be of the commercial type, with direct lighting with 10% of the light directed upwards, to be mounted on the wall, and be fitted with a reflector.
  - .8 A microwave and a small refrigerator (9 cubic feet minimum).
  - .9 A distributor of cold and hot water, including the supply of drinking water.
  - .10 Install a private toilet near the office and install a chemical or flush toilet, sink and mirror, and supply paper towels and toilet paper.

- .11 Furnish the office with a 1 mx 3 m table, 8 chairs, 300 mm wide shelving, totaling 6 m in length, a filing cabinet with three drawers, a drawing support and a clothes rack, with shelf.
- .12 The Contractor must maintain the office of the Government Representative until the final quantities are accepted by the Government Representative and the Contractor.
- .13 All costs of supply, insurance (vandalism and theft), maintenance and operation of this equipment, as well as all costs of long-distance calls made by the Government Representative or by his representatives for the needs of this contract are included in the site installations item.
- .14 The Contractor must perform weekly cleaning of the premises, including the private toilet and the office of the Government Representative.
- .15 Keep the premises clean.

#### **1.12 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

#### **1.13 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

#### **1.14 CONSTRUCTION SIGNAGE**

- .1 Provide and erect project sign, within three (3) weeks of signing Contract, in a location designated by the Government Representative.
- .2 Construction sign 1,200 mm x 2,400 mm, of wood frame and plywood construction painted with lettering produced by a professional sign painter.
- .3 It is not allowed to have information on the names, addresses and telephone numbers on the site installations of contractors, sub-contractors, suppliers, etc.
- .4 The panel must indicated the name of the Contracting Authority, the Consultant and the Contractor; the stylized lettering used will be determined by the Government Representative.
- .5 Apart from the warning signs, no other sign or other poster may be installed on the site.
- .6 Provide project identification site sign comprising foundation, framing, and one 1200 x 2400 mm signboard as detailed and as described below.
  - .1 Foundations: 15 MPa concrete to CSA-A23.1 minimum 200 mm x 900 mm deep.
  - .2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.
  - .3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.

- .4 Paint: alkyd resin printing paint, exterior, in accordance with CAN / CGSB 1.189 standard; enamel paint with alkyd resins, conforms to standard CAN / CGSB-1.59.
- .5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
- .6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay, supplied by PCA Project Manager.
- .7 Locate project identification sign as directed by Government Representative and construct as follows:
  - .1 Build concrete foundation, erect framework, and attach signboard to framing.
  - .2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
  - .3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.
- .8 Submit to the Government Representative requests for approval for the installation of a Consultant / Contractor identification panel. The general appearance of this sign must correspond to that of the site sign and the inscriptions must be written in both official languages.
- .9 The inscriptions appearing on the instruction panels and on the Safety Notices must be written in both official languages. The graphic symbols must conform to the CAN / CSA-Z321 standard.
- .10 Maintain approved signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier if directed by Government Representative.

#### **1.15 PROTECTION AND MAINTENANCE OF TRAFFIC**

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Government Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watchpersons and flagmen, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning danger, and direction signs as shown on traffic management drawings.
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary.
- .8 Develop site haul roads with an adequate slope and width; avoid sharp curves, blind turns and any dangerous intersection.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Dust control: adequate to ensure safe operation at all times.

- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Government Representative.
- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Government Representative.

**1.16 CLEAN-UP**

- .1 Perform cleaning work in accordance with section 01 74 00 - *Cleaning*.
- .2 Sort waste for recycling, in accordance with section 01 74 19 - *Waste Management and Disposal*.
- .3 Evacuate debris, waste and packaging materials daily from the construction site.
- .4 Remove dust and mud from hard surfaced pavements.
- .5 Store materials / equipment recovered during demolition work.
- .6 Do not store new materials / materials or recovered materials / materials in site installations.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- .1 Install sediment barriers made of a geotextile, in accordance with section 01 35 43 - *Environmental Procedures*.
- .2 Install a curtain of turbidity, in accordance with section 01 35 43 - *Environmental Procedures*.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 13.13 – *Paving Removal.*
- .2 Section 02 41 16 – *Structure Demolition.*
- .3 Section 02 83 12 – *Lead Base Paint Abatement – Maximum Precautions*
- .4 Section 03 10 00 – *Concrete Forming.*
- .5 Section 03 20 00 – *Concrete Reinforcing.*
- .6 Section 03 30 00 – *Cast-in-place Concrete.*
- .7 Section 03 30 03 – *Concrete Repairs.*
- .8 Section 05 12 33 – *Structural Steel for Bridges.*
- .9 Section 05 50 00 – *Metal Fabrication.*
- .10 Section 07 13 52 – *Modified Bituminous Sheet Waterproofing.*
- .11 Section 09 91 13.23 – *Exterior Painting of Structural Steel.*
- .12 Section 31 05 16 – *Aggregates for Earthwork.*
- .13 Section 32 12 16 – *Bituminous Pavement Covering.*
- .14 Section 32 17 23 – *Pavement Marking.*
- .15 Section 34 71 13.25 – *Vehicle W-Beam Guide Rail.*

**1.2 REFERENCE STANDARDS**

- .1 Canadian General Standards Board (CGSB)
  - .1 CGSB 1.59, latest edition, Alkyd Exterior Gloss Enamel.
  - .2 CAN/CGSB 1.189, latest edition, Exterior Alkyd Primer for Wood.
- .2 CSA Group (CSA)
  - .1 CSA-O121, latest edition, Douglas Fir Plywood.

**1.3 INSTALLATION AND REMOVAL**

- .1 Provide, set up or arrange the temporary access and protection works necessary to allow the work to be executed as soon as possible.
- .2 Contractor shall dismantle the equipment and evacuate it from the site when it is no longer needed following inspection and acceptance of the work by the Government Representative.

#### **1.4 CONSTRUCTION ENCLOSURE**

- .1 Install rigid site fence panels vertically at least 2440mm high and join them end to end and flush. The fence must surround the mobilization zone and the work zone in order to restrict access to the site perimeter. This fence must remain in place for the duration of the work.
- .2 Provide one (1) lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.
- .3 Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.
- .4 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures, following instructions from Government Representative.
- .5 All temporary works must be signed and sealed by a competent engineer member in good standing of the Ordre des ingénieurs du Québec.

#### **1.5 GUARD RAILS AND BARRICADES**

- .1 Provide secure, rigid guard rails and barricades to be installed around openings in bridge decks created to perform Work specified in the Contract.
- .2 Provide and install these elements in accordance with the requirements of the Government Representative or any other competent authority.
- .3 In no case Contractor may use existing works for his work. He must take the necessary precautions to protect them and he assumes full responsibility for any claim resulting from the damage attributable to him.
- .4 Under no circumstances shall it be permitted to attach guardrails to existing structures without the authorization of the Government Representative. The Contractor shall submit the shop drawings and the work procedure to the Government Representative ten (10) working days prior to the start of the work.
- .5 All temporary works must be signed and sealed by a competent engineer member in good standing of the Ordre des ingénieurs du Québec.

#### **1.6 PLATFORMS AND ACCESS SYSTEM**

- .1 The Contractor shall submit to the Government Representative the Shop Drawings, design calculations five (5) working days after receipt of the award letter or at the start-up meeting (whichever is the latest date of the two) as indicated in sections 01 33 00 *Submittal Procedures*. These elements must be installed for the duration of the works and activities. No work will be allowed without the installation of access platforms and systems. The PCA representative may stop the work if these systems are not installed and the delay will be at the expense of the Contractor.

#### **1.7 WEATHER ENCLOSURES**

- .1 Design enclosures to withstand wind pressure and snow loading.



## 1.8 DUST TIGHT SCREENS

- .1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.
- .3 In the event of breakage or vandalism, repair or replace dust-tight screens.
- .4 Provide shop drawings and data sheets required for approval by the Government Representative ten (10) working days before starting work that may generate dust.
- .5 All temporary works must be signed and sealed by a competent engineer member in good standing of the Ordre des ingénieurs du Québec.

## 1.9 TEMPORARY ACCESS STRUCTURES

- .1 Comply with all laws, regulations, intergovernmental agreements and orders from authorities that may at any time or in any way have an impact on the work, labour, equipment or materials.
- .2 Assume responsibility for and bear costs of any claim or obligation regarding the violation of such laws, regulations or orders by itself, its subcontractors or their respective employees.
- .3 Before starting the work, obtain, at own cost, all licences or permits required by law, order or regulation.
- .4 Describe the proposed method for performing repairs to a permanent structure on the drawings for the temporary access structures.
- .5 Shop drawings, design calculations and work plans must be prepared, signed and sealed by a qualified engineer in good standing with the Ordre des ingénieurs du Québec. The work plan must present structural calculations, the assumptions behind the calculations, the sequences for assembling and dismantling the various structures as well as any related structures.
- .6 Gauron Bridge (7)
  - .1 Temporary access structure over the Lachine Canal
    - .1 Install scaffolding or platforms required on the bridge structure for the safe performance of all reinforcement work described in the construction documents of this Contract in a safe manner.
    - .2 This temporary access structure will be used for reinforcement of end members, bottom chords and main gussets of triangulated trusses of the bridge.
    - .3 Present shop drawings and work plan to the Government Representative at least ten (10) days before the start of work.
    - .4 Notify the Government Representative of the date of installation of the temporary access structure five (5) days before the start of installation.
  - .2 Containment system for cleaning and painting the steel surfaces of the entire bridge structure, on site.
    - .1 Provide, install and dismantle at the end of work a containment enclosure for cleaning and painting of steel surfaces of the entire bridge structure.



- .2 Provide a **Total Containment System** as described in the *Guide de peinture des charpentes métalliques*, published by the Direction des structures du ministère des Transports du Québec.
- .3 The containment system must be in accordance with federal, provincial and municipal standards in effect in the City of Montreal;
- .4 The containment system must ensure the protection of the environment by preventing the escape of materials and dust generated by the cleaning and painting of the steel surfaces on site in accordance with federal, provincial and municipal standards in effect in the City of Montreal
- .5 Build the enclosure as follows, including without limitation and in accordance with federal, provincial and municipal standards in effect in the City of Montreal:
  - .1 Use weatherproof seals;
  - .2 Install impermeable membranes with sealed and overlapping seams;
  - .3 Affix the membranes tightly at close intervals to minimize wind load;
  - .4 Seal the joints between construction materials, such as plywood panels used for floors and walls;
  - .5 Create a negative pressure system to remove dust from within the system;
  - .6 Ventilate the work area adequately.
- .3 Temporary counterweight access structure
  - .1 Install the required scaffolding or platforms on the structure to perform all cleaning, repair and waterproofing work described in the construction documents of this Contract in a safe manner.
  - .2 This temporary access structure will be used for the cleaning, repair and waterproofing of concrete counterweights, including the replacement of plywood panels.
  - .3 Present shop drawings and work plan to the Government Representative at least ten (10) days before the start of work.
  - .4 Notify the Government Representative of the date of installation of the temporary access structure five (5) days before the start of installation.
- .7 Lafleur Bridge (7)
  - .1 Temporary counterweight access structure
    - .1 Install the required scaffolding or platforms on the structure to perform all cleaning, repair and waterproofing work described in the construction documents of this Contract in a safe manner.
    - .2 This temporary access structure will be used for the cleaning and waterproofing of concrete counterweights.
    - .3 Present shop drawings and work plan to the Government Representative at least ten (10) days before the start of work.

- .4 Notify the Government Representative of the date of installation of the temporary access structure five (5) days before the start of installation.

**1.10 ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

**1.11 PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect public.

**1.12 FIRE ROUTES**

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

**1.13 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

**1.14 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.

**1.15 CLEANING**

- .1 Cleaning during work: clean in accordance with Section 01 74 00 – *Cleaning*.
  - .1 Leave the Work site clean at the end of each working day.
- .2 Final Cleaning: dispose of surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – *Cleaning*.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 13.13 – *Paving Removal*
- .2 Section 02 41 16 – *Structure Demolition*
- .3 Section 02 83 12 – *Lead Base Paint Abatement – Maximum Precautions*
- .4 Section 03 10 00 – *Concrete Forming*
- .5 Section 03 20 00 – *Concrete Reinforcing*
- .6 Section 03 30 00 – *Cast-in-place Concrete*
- .7 Section 03 30 03 – *Concrete Repairs*
- .8 Section 05 12 33 – *Structural Steel for Bridges*
- .9 Section 05 55 00 – *Metal Fabrication*
- .10 Section 07 13 52 – *Modified Bituminous Sheet Waterproofing*
- .11 Section 09 91 13.23 – *Exterior Painting of Structural Steel*
- .12 Section 31 05 16 – *Aggregates for Earthwork*
- .13 Section 32 12 16 – *Bituminous Pavement Covering*
- .14 Section 32 17 23 – *Pavement Marking*
- .15 Section 34 71 13.25 – *Vehicle W-Beam Guide Rail*

**1.2 REFERENCE STANDARDS**

- .1 If there is question as to whether products or systems are in conformance with applicable standards, Government Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .2 Cost for such testing will be born by PCA Project Manager in event of conformance with Contract Documents or by Contractor in event of non-conformance.

**1.3 QUALITY**

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.
- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve the Contractor's responsibility but is precaution against oversight or error. The Contractor must remove and

replace defective products at own expense and be responsible for delays and expenses caused by rejection.

- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with Government Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

#### **1.4 AVAILABILITY**

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Government Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Government Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, The Government Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.
- .3 No substitution of materials will be accepted without the approval of the Government Representative.

#### **1.5 STORAGE, HANDLING AND PROTECTION**

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer s instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer s seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store construction lumber as well as sheet and panel materials on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Government Representative.
- .9 Touch-up damaged factory finished surfaces to Government Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

**1.6 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.

**1.7 MANUFACTURER S INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer s instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Government Representative in writing, of conflicts between specifications and manufacturer’s instructions, so that Government Representative will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Government Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

**1.8 QUALITY OF WORK**

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Government Representative if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Government Representative reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Government Representative, whose decision is final.

**1.9 CO-ORDINATION**

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

**1.10 CONCEALMENT**

- .1 Before installation inform Government Representative if there is interference. Install as directed by Government Representative.

**1.11 REMEDIAL WORK**

- .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

**1.12 LOCATION OF FIXTURES**

- .1 Not used.

**1.13 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.14 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Bolts may not project more than one diameter beyond nuts.
- .3 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

**1.15 PROTECTION OF WORK IN PROGRESS**

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval Government Representative.

**1.16 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

.1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 13.13 – *Paving Removal*
- .2 Section 02 41 16 – *Structure Demolition*
- .3 Section 02 83 12 – *Lead Base Paint Abatement – Maximum Precautions*
- .4 Section 03 10 00 – *Concrete Forming*
- .5 Section 03 20 00 – *Concrete Reinforcing*
- .6 Section 03 30 00 – *Cast-in-place Concrete*
- .7 Section 03 30 03 – *Concrete Repairs*
- .8 Section 05 12 33 – *Structural Steel for Bridges*
- .9 Section 05 55 00 – *Metal Fabrication*
- .10 Section 07 13 52 – *Modified Bituminous Sheet Waterproofing*
- .11 Section 09 91 13.23 – *Exterior Painting of Structural Steel*
- .12 Section 31 05 16 – *Aggregates for Earthwork*
- .13 Section 32 12 16 – *Bituminous Pavement Covering*
- .14 Section 32 17 23 – *Pavement Marking*
- .15 Section 34 71 13.25 – *Vehicle W-Beam Guide Rail*

**1.2 AVAILABLE INFORMATION FROM THE EXISTING CONSULTANT**

- .1 The Parks Canada Agency makes available to contractors, information available in the appendix on the walls of the Lachine Canal.
  - .1 I - Photos of the crowning walls;
  - .2 II - Parks Canada property plan;
  - .3 III - Contaminated soil plan;
  - .4 IV - List of trees;
  - .5 V - Contaminated soils;
  - .6 VI - 3D sections;
  - .7 VII - Urban furniture;
  - .8 VIII - Register
- .2 The Agency does not guarantee the accuracy of the information contained in these available documents described above and disclaims all responsibility in this regard.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Submit written request in advance of cutting or alteration which affects:



- .1 Structural integrity of elements of project.
- .2 Integrity of weather-exposed or moisture-resistant elements.
- .3 Efficiency, maintenance, or safety of operational elements.
- .4 Visual qualities of sight-exposed elements.
- .5 Work of Owner or separate contractor.
- .3 Include in request:
  - .1 Identification of project.
  - .2 Location and description of affected Work.
  - .3 Statement on necessity for cutting or alteration.
  - .4 Description of proposed Work, and products to be used.
  - .5 Alternatives to cutting and patching.
  - .6 Effect on Work of Owner or separate contractor.
  - .7 Written permission of affected separate contractor.
  - .8 Date and time work will be executed.

#### **1.4 SKILLS OF THE LABOR**

- .1 The Contractor must employ, as project manager, general foreman or foreman, competent people with relevant experience and sufficient training to easily understand the plans and specifications. These employees must direct the work so as to obtain results in accordance with the requirements of the contract. These conditions also apply to the foremen of the subcontractors.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Required for original installation.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - *Submittal Procedures*.

#### **2.2 STATUS AND CAPACITY OF THE MATERIAL**

- .1 The Contractor must use appropriate equipment, in sufficient capacity quantity to allow the work to be carried out within the time specified in the contract. This equipment must be in good working order and safe for workers and the public, according to the laws, regulations and decrees in force. Any material that leaks liquids damaging to the works or the environment (hydrocarbons, oils or other harmful products) is not allowed to enter the site limits.

**Part 3 Execution**

**3.1 PREPARATION**

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

**3.2 EXECUTION**

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .6 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .7 Restore work with new products in accordance with requirements of Contract Documents.
- .8 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- .9 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.

**3.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 02 41 13.13 – *Paving Removal*
- .2        Section 02 41 16 – *Structure Demolition*
- .3        Section 02 83 12 – *Lead Base Paint Abatement – Maximum Precautions*
- .4        Section 03 10 00 – *Concrete Forming*
- .5        Section 03 20 00 – *Concrete Reinforcing*
- .6        Section 03 30 00 – *Cast-in-place Concrete*
- .7        Section 03 30 03 – *Concrete Repairs*
- .8        Section 05 12 33 – *Structural Steel for Bridges*
- .9        Section 05 55 00 – *Metal Fabrication*
- .10       Section 07 13 52 – *Modified Bituminous Sheet Waterproofing*
- .11       Section 09 91 13.23 – *Exterior Painting of Structural Steel*
- .12       Section 31 05 16 – *Aggregates for Earthwork*
- .13       Section 32 12 16 – *Bituminous Pavement Covering*
- .14       Section 32 17 23 – *Pavement Marking*
- .15       Section 34 71 13.25 – *Vehicle W-Beam Guide Rai*

**1.2                REFERENCE STANDARDS**

- .1        Not used

**1.3                PROJECT CLEANLINESS**

- .1        Maintain Work in tidy condition, free from accumulation of waste products and debris.
- .2        Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Government Representative. Do not burn waste materials on site.
- .3        Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4        Provide on-site containers for collection of waste materials and debris.
- .5        Provide and use marked separate bins for recycling. Refer to Section 01 74 19 - *Waste Management and Disposal*.
- .6        Remove debris and waste materials to designated and approved disposal areas located off-site in accordance with prevailing legislation.
- .7        Clean interior areas prior to start of finishing work and maintain areas free of dust and other contaminants during finishing operations.

- .8 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .9 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .10 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

#### **1.4 FINAL CLEANING**

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Remove waste products and debris other than that caused by others and leave Work clean and suitable for occupancy.
- .3 Prior to final inspection, remove surplus products, tools, construction machinery and equipment.
- .4 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures.
- .5 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .6 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .7 Remove dirt and other disfiguration from exterior surfaces.

#### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling and reuse in accordance with Section 01 74 19 - *Waste Management and Disposal*.

#### **1.6 WORK AREA RESTORATION**

- .1 The contractor must repair or rebuild the fences and other necessary works that he has demolished or damaged and dispose of all materials, and this, so as not to disrupt the surroundings of the work and related works.
- .2 The contractor must repair all other damage and damage it has caused on the work site, to public or private property affected by its work, to bodies of water, camp sites, storage of equipment, storage or supply of materials and the environment.
- .3 Restore the road surfaces affected by the work in the condition and level they were before the start of the latter, making sure to respect the original thickness of these works.
- .4 Clean and restore areas affected by the work, as directed by the Government Representative.

**Part 2          Products**

**2.1              NOT USED**

.1          Not Used.

**Part 3          Execution**

**3.1              NOT USED**

.1          Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 SUMMARY**

- .1 This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill and includes the following:
  - .1 Preparation of a Draft Waste Management and Disposal Plan that will be used to track the success of the Waste Management and Disposal Plan against actual waste diversion from landfill.
  - .2 Preparation of monthly progress reports indicating cumulative totals representing progress towards achieving diversion and reduction goals of waste materials away from landfill and identifying any special programs, landfill options or alternatives to landfill used during construction.
- .2 Parks Canada Agency has established that this project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors be employed by the Contractor.

**1.2 RELATED REQUIREMENTS**

- .1 Section 02 41 13.13 *Paving removal*
- .2 Section 02 41 16 *Structure Demolition*
- .3 *Section 02 83 00.03 Lead-based paint abatement: Maximum precautions*

**1.3 REFERENCE STANDARDS**

- .1 ASTM International (ASTM)
  - .1 ASTM E1609 01, Standard Guide for Development and Implementation of a Pollution Prevention Program
- .2 Recycling Certification Institute (RCI):
  - .1 RCI Certification Construction and Demolition Materials Recycling

**1.4 DEFINITIONS**

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, repair and demolition.
- .3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 Non hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.

- .5 Non toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .16 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
  - .1 Solvents in paints and other coatings;
  - .2 Wood preservatives; strippers and household cleaners;
  - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
  - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- .18 Construction Waste Management Plan: A project related plan for the collection, transportation, and disposal of the waste generated at the construction site; the purpose of the plan is to ultimately reduce the amount of material being landfilled.

## 1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project and ensure that requirements of the Waste Management and Disposal Plan are followed.
- .2 Preconstruction Meeting: Arrange a pre-construction meeting in accordance with Section 01 31 19– *Project Meetings* before starting any Work of the Contract attended by the PCA Project Manager, the Government Representative and the Contractor to discuss the

Contractor's Waste Management and Disposal Plan and to develop mutual understanding of the requirements for a consistent policy towards waste reduction and recycling.

## **1.6 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide required information in accordance with Section 01 33 00– *Submittal Procedures*.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .1 Waste Management and Disposal Plan: Submit to Government Representative a preliminary analysis of anticipated site generated waste by listing a minimum of five (5) construction or demolition waste streams that have potential to generate the most volume of material indicating methods that will be used to divert construction waste from landfill and source reduction strategies; Government Representative will provide commentary before development of Contractor's Waste Management and Disposal Plan.

## **1.7 PROJECT CLOSEOUT SUBMISSIONS**

- .1 Not used.

## **1.8 QUALITY ASSURANCE**

- .1 Resources for Development of Waste Management and Disposal Report: The following sources may be useful in developing the Draft Construction Waste Management and Disposal Plan:
  - .1 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials and incorporate into Waste Management and Disposal Plan.
  - .2 Waste-to-Energy Systems: Investigate local waste-to-energy incentives where systems for diverting materials from landfill for reuse or recycling are not available.

## **1.9 DELIVERY, STORAGE AND HANDLING**

- .1 Storage Requirements: Implement a recycling/reuse program that includes separate collection of waste materials as appropriate to the project waste and the available recycling and reuse programs in the project area.
- .2 Handling Requirements: Clean materials that are contaminated before placing in collection containers and ensure that waste destined for landfill does not get mixed in with recycled materials:
  - .1 Deliver materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
  - .2 Arrange for collection by or delivery to the appropriate recycling or reuse facility.
- .3 Hazardous Waste and Hazardous Materials: Handle in accordance with applicable regulations.



**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 WASTE MANAGEMENT AND DISPOSAL PLAN IMPLEMENTATION**

- .1 **Manager:** Contractor is responsible for designating an on-site parties responsible for instructing workers and overseeing and documenting results of the Waste Management and Disposal Plan for the project.
- .2 **Distribution:** Distribute copies of the Waste Management and Disposal Plan to the job site foreman, each Subcontractor, PCA Project Manager, the Government Representative and other site personnel as required to maintain Waste Management and Disposal Plan.
- .3 **Instruction:** Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractor's at appropriate stages of the project.
- .4 **Separation Facilities:** Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:
  - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
  - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.
- .5 **Progressive Documentation:** Submit a monthly summary of waste generated by the project to ensure that waste diversion goals are on track with project requirements:
  - .1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between PCA Project Manager, Contractor and Government Representative.
  - .2 Monthly waste summary shall contain the following information:
    - .1 The amount in tonnes or m<sup>3</sup> and location of material landfilled,
    - .2 The amount in tonnes or m<sup>3</sup> and location of materials diverted from landfill, and
    - .3 Indication of progress based on total waste generated by the project with materials diverted from landfill as a percentage.

**3.2 SUBCONTRACTOR'S RESPONSIBILITY**

- .1 Subcontractor's shall cooperate fully with the Contractor to implement the Waste Management and Disposal Plan.
- .2 Failure to cooperate may result in the Owner not achieving their environmental goals, and may result in penalties being assessed by the Contractor to the responsible Subcontractor's.

### 3.3 SAMPLE CONSTRUCTION WASTE MANAGEMENT FORMS

- .1 Sample waste tracking form below can be used by the Contractor to establish their own forms for recording management of construction waste:

Material Stream	Diverted Waste by Report Date	Total	Units				
May	June	July	August	Sept.	Oct.	Nov.	Dec.
Material Streams Contributing to Credit	Plastic	1.25	2.5	10	5	18.75	m <sup>3</sup>
Carpet	2.5	2.5	2.5	0	7.5	m <sup>3</sup>	
Paper/Cardboard	5	2.5	2.5	5	15	m <sup>3</sup>	
Clean Wood	0	25	0	1.25	26.25	m <sup>3</sup>	
Metal	1.25	2.5	5.5	7	16.25	m <sup>3</sup>	
Gypsum Board	2.5	2.5	4	5	14	m <sup>3</sup>	
Brick/Concrete	10.5	2.5	5.5	8.75	27.25	m <sup>3</sup>	
Asphalt Shingles	10	0	0	0	10	m <sup>3</sup>	
Total Diverted Waste	135	m <sup>3</sup>					
Material Streams not Contributing to Credit	Landfill	10.75	7.5	15	10	43.25	m <sup>3</sup>
Screen Fines (ADC)	5	1.25	0	2.5	8.75	m <sup>3</sup>	
150 mm Minus (ADC)	1.25	1.25	5	5.5	13	m <sup>3</sup>	
Total Landfill/ADC Waste	65	m <sup>3</sup>					
Total Waste	200	m <sup>3</sup>					
Percent Diverted	67.5	%					

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 13.13 – Paving Removal.
- .2 Section 02 41 16 – Structure Demolition.
- .3 Section 02 83 12 – Lead Base Paint Abatement – Maximum Precautions
- .4 Section 03 10 00 – Concrete Forming.
- .5 Section 03 20 00 – Concrete Reinforcing.
- .6 Section 03 30 00 – Cast-in-place Concrete.
- .7 Section 03 30 03 – Concrete Repairs.
- .8 Section 05 12 33 – Structural Steel for Bridges.
- .9 Section 05 50 00 – Metal Fabrication.
- .10 Section 07 13 52 – Modified Bituminous Sheet Waterproofing.
- .11 Section 09 91 13.23 – Exterior Painting of Structural Steel.
- .12 Section 31 05 16 – Aggregates for Earthwork.
- .13 Section 32 12 16 – Bituminous Pavement Covering.
- .14 Section 32 17 23 – Pavement Marking.
- .15 Section 34 71 13.25 – Vehicle W-Beam Guide Rail.

**1.2 REFERENCE STANDARDS**

- .1 Invitation to tender;
- .2 Canadian Environmental Protection Act (CEPA)
  - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Acceptance of Work Procedures:
  - .1 Contractor's Inspection:
    - .1 Contractor must conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .2 Contractor must notify Government Representative by writing when Work are complete and ready for acceptance.
  - .2 Government Representative Inspection:
    - .1 Government Representative and Contractor to inspect Work and identify defects and deficiencies.

- .2 If Work are not acceptable to the Government Representative, he will notify by writing the Contractor, who should correct Work as directed.
- .3 Completion Tasks: submit written in French and English certificates that tasks have been performed as follows:
  - .1 Work: completed and inspected for compliance with Contract Documents.
  - .2 Defects: corrected and deficiencies completed.
  - .3 Work: complete and ready for final inspection.
- .4 Final Inspection:
  - .1 When completion tasks are done, request final inspection of Work by Government Representative and Contractor
  - .2 When Work incomplete according to Government Representative, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance:
  - .1 When Government Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods:
  - .1 The date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment:
  - .1 When Government Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
  - .2 If Work deemed incomplete by Government Representative, complete outstanding items and request re-inspection.
- .8 Payment of Holdback:
  - .1 After issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

#### 1.4 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management:
  - .1 Separate waste materials for recycling or reuse in accordance with Section 01 74 19 - *Waste Management and Disposal*.

**Part 2            Products**

**2.1                NOT USED**

.1            Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 01 77 00 – *Closeout Procedures*.

**1.2 REFERENCE STANDARDS**

- .1 Canadian Environmental Protection Act (CEPA)
  - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

**1.3 ADMINISTRATIVE REQUIREMENTS**

- .1 Pre-warranty Meeting:
  - .1 Convene meeting one (1) week prior to contract completion with contractor's representative and Government Representative, in accordance with Section 01 31 19 - *Project Meetings* to verify Project requirements.
  - .2 Government Representative to establish communication procedures for:
    - .1 Notifying construction warranty defects.
    - .2 Determine priorities for type of defects.
    - .3 Determine reasonable response time.
  - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
  - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Provide evidence, if requested, for type, source and quality of products supplied.
- .3 Provide plan as built showing the effective intervention zone, the changes to documents issued for construction and approved final profiles.

**1.5 FORMAT**

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
  - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

- .5 Arrange content by process flow, systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
  - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dwg format on CD.

## 1.6 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
  - .1 Date of submission.
  - .2 Name, addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.
  - .3 Schedule of products and systems indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data.
  - .1 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - *Quality Control*.

## 1.7 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain at site for Government Representative one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.

- .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
  - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
  - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by the Government Representative.

## **1.8 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS**

- .1 Record information on set of black line opaque drawings provided by the Government Representative.
- .2 Record information concurrently with construction progress.
  - .1 Do not conceal Work until required information is recorded.
- .3 Contract Drawings and shop drawings: mark each item to record actual construction, including:
  - .1 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .2 Measured locations of internal utilities and appurtenances referenced to visible and accessible features of construction.
  - .3 Field changes of dimension and detail.
  - .4 Changes made by change orders.
  - .5 Details not on original Contract Drawings.
  - .6 Referenced Standards to related shop drawings and modifications.
- .4 Specifications: mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and change orders.
- .5 Other Documents: maintain field test records required by individual specifications sections.
- .6 Provide digital photos, if requested, for site records.

## **1.9 FINAL SURVEY**

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - *Examination and Preparation*, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

## **1.10 WARRANTIES AND BONDS**

- .1 Develop warranty management plan to contain information relevant to Warranties.



- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Government Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Government Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to the Government Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:
  - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of applicable item of work.
  - .4 Verify that documents are in proper form, contain full information, and are notarized.
  - .5 Co-execute submittals when required.
  - .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Conduct joint 9 month warranty inspection, measured from time of acceptance, by the Government Representative.
- .9 Include information contained in warranty management plan as follows:
  - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
  - .2 Provide list for each warranted equipment, item, feature of construction or system indicating:
    - .1 Name of item.
    - .2 Model and serial numbers.
    - .3 Location where installed.
    - .4 Name and phone numbers of manufacturers or suppliers.
    - .5 Names, addresses and telephone numbers of sources of spare parts.
    - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
    - .7 Cross-reference to warranty certificates as applicable.
    - .8 Starting point and duration of warranty period.

- .9 Summary of maintenance procedures required to continue warranty in force.
- .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .3 Contractor's plans for attendance at 9 month post-construction warranty inspections.
- .4 Procedure and status of tagging of equipment covered by extended warranties.
- .5 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification to follow oral instructions.
  - .1 Failure to respond will be cause for the Government Representative to proceed with action against Contractor.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 SUMMARY**

- .1 Section includes descriptions for demolishing, salvaging, recycling and removing of asphalt paving identified in whole or in part, and for backfilling trenches and excavations resulting from site demolition activities a required by scope of work.

**1.2 RELATED REQUIREMENTS**

- .1 Section 02 41 16 – *Structure demolition*
- .2 REFERENCE STANDARDS
- .3 Department of Justice Canada (Jus)
  - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
  - .2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.
- .4 U.S. Environmental Protection Agency (EPA)/Office of Water
  - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.3 DEFINITIONS**

- .1 Demolish: Detach items from existing construction and legally dispose of them off site, unless indicated to be removed and salvaged or removed and reinstalled.
- .2 Existing to Remain: Existing items of construction that are not removed and that are not otherwise indicated as being removed, removed and salvaged, or removed and reinstalled
- .3 Draft Waste Management Plan: Detailed inventory of materials in building indicating estimated quantities of reuse, recycling and landfill, prepared in accordance with Section 01 74 19 - *Construction Waste Management and Disposal* and as follows:
  - .1 Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project.
- .4 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .5 Waste Management Plan: Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19- *Waste Management and Disposal*.
- .6 Waste Management Report: Written report identifying actual materials that formed Waste Management Plan for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19- *Waste Management and Disposal*.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate requirements for Waste Management and Disposal for materials being reused or recycled in accordance with Section 01 74 19- *Waste Management and Disposal*:
  - .1 Divert excess materials from landfill
  - .2 Separate materials identified for recycling place in identified areas in accordance with Waste Management Plan
  - .3 Label location of salvaged materials storage areas and provide barriers and security devices
  - .4 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities
- .2 Pre Construction Meeting: Arrange a pre construction meeting in accordance with Section 01 31 19 – *Project Meetings* ; attended by Contractor’s key personnel the Government Representative to discuss the following:
  - .1 Verify project requirements.
  - .2 Review site conditions.
  - .3 Examine existing site conditions adjacent to demolition work, prior to start of Work.
  - .4 Waste reporting requirements.

#### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit required documents and samples in accordance with Section 01 33 00 – *Submittal Procedures*.
- .2 Action Submittals: Provide following submittals before starting work of this Section:
  - .1 Shop Drawings: Submit shop drawings indicating diagrams or details showing sequence of demolition work.
- .3 Informational Submittals: Provide following submittals during course of work:
  - .1 Certificates: Submit copies of certified weigh bills, bills of lading or receipts from authorized disposal sites and re use and recycling facilities for material removed from site on weekly basis.
- .4 Sustainable Design Submittals:
  - .1 Erosion and Sedimentation Control: submit one (1) copy of erosion and sedimentation control plan in accordance with authorities having jurisdiction.
  - .2 Construction Waste Management: Submit project CWM Plan highlighting recycling and salvage requirements in accordance with Section 01 74 19 - *Waste Management and Disposal*.

#### 1.6 QUALITY ASSURANCE

- .1 Quality Assurance in accordance with Section 01 45 00 – *Quality Control*.

- .2 Regulatory Requirements: ensure Work is performed in compliance with applicable Provincial/Territorial regulations.
- .3 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

## 1.7 SITE CONDITIONS

- .1 Perform Work in accordance with Sections 01 35 43 – *Environmental Procedures* and 01 35 29.06 – *Health and Safety Requirements*.
- .2 Protect existing site features to remain or identified for salvage or re use; make repairs and restore to a similar condition to existing where damage to these items occurs as directed by Government Representative and at no cost to Owner:
  - .1 Remove and store salvaged materials to prevent contamination.
  - .2 Store and protect salvaged materials as required for maximum preservation of material.
  - .3 Handle salvaged materials same as new materials.
- .3 Perform pavement removal work to prevent adverse effects to adjacent watercourses, groundwater and wildlife, and to prevent excess air and noise pollution:
  - .1 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.
  - .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with Authorities Having Jurisdiction.
- .4 Protect existing site features and structures, trees, plants and foliage on site and adjacent properties.

## Part 2 Products

### 2.1 EQUIPMENT

- .1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from string guidance, which will remove part of the pavement surface at specified depths or dimensions.
- .2 For paving surfaces laid on a concrete slab, use equipment that does not damage the slab or other elements of the underlying structure and has a maximum mass of 23t or the displayed capacity of the structure for a minimum two-axle truck. The use of material intended for correction by leveling is prohibited to conduct stripping.

## Part 3 Execution

### 3.1 PREPARATION

- .1 Verify extent and location of asphalt identified for removal, disposal, alternative disposal, recycling, salvage and items to remain.

- .2 Locate and protect utilities, preserve active utilities traversing site in operating condition.
- .3 Temporary Erosion and Sedimentation Control:
  - .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
  - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
  - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .4 Prior to beginning removal operation, inspect and verify with Government Representative, areas, depths and lines of asphalt pavement to be removed.
- .5 Protection: protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Government Representative at no additional cost.

### **3.2 REMOVAL**

- .1 Remove existing asphalt pavement to lines and grades as indicated on drawings.
- .2 Demolition of pavements, curbs and gutters:
  - .1 Square up adjacent surfaces to remain in place by saw cutting or other method acceptable to Government Representative on site.
  - .2 Protect adjacent joints and load transfer devices.
  - .3 Protect underlying and adjacent granular materials where they are exposed and identified to remain.
  - .4 Prevent contamination with base layer aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving.
- .3 Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.
- .4 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .5 Suppress dust generated by removal process.

### **3.3 FINISH TOLERANCES**

- .1 Finished surfaces in areas where asphalt pavement has been removed within  $\pm 5$  mm of grade specified but not uniformly high or low.

### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: sort waste for recycling in accordance with Section 01 74 19 – *Waste Management and Disposal*.
  - .1 Prepare a construction waste reduction plan in accordance with Section 01 74 19 – *Waste Management and Disposal*.
- .4 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand broom as required.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 30 03 *Concrete repairs*
- .2 Section 05 12 33 *Structural steel for bridges*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 CSA S350, latest edition, Code of Practice for Safety in Demolition of Structures.
- .2 Department of Justice Canada (Jus)
  - .1 Canadian Environmental Assessment Act (CEAA), latest edition.
  - .2 Canadian Environmental Protection Act (CEPA), latest edition.
  - .1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
  - .2 SOR/2006-268, Regulations Amending the On-Road Vehicle and Engine Emission Regulations.
  - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .3 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S660, latest edition, Standard for Nonmetallic Underground Piping for Flammable and Combustible Liquids.
  - .2 ULC/ORD-C58.15, latest edition, Overfill Protection Devices for Flammable Liquid Storage Tanks.
  - .3 ULC/ORD-C58.19, latest edition, Spill Containment Devices for Underground Flammable Liquid Storage Tanks.
- .4 U.S. Environmental Protection Agency (EPA)
  - .1 EPA CFR 86.098-10, Emission standards for 1998 and later model year Otto-cycle heavy-duty engines and vehicles.
  - .2 EPA CFR 86.098-11, Emission standards for 1998 and later model year diesel heavy-duty engines and vehicles.
  - .3 EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.3 DEFINITIONS**

- .1 Demolition: rapid destruction of building following removal of Hazardous Substances.



- .2 Hazardous Substances: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB s, CFC s, HCFC s poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or wellbeing or environment if handled improperly.
- .3 Waste Management Co-ordinator (WMC): Contractor's Representative responsible for supervising waste management activities as well as co-ordinating related, required submittal and reporting requirements.
- .4 Draft Construction Waste Management Plan (Draft CWM Plan): Detailed inventory of materials in building indicating involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Estimated quantities of reuse, recycling and landfill, prepared in accordance with Section 01 74 19 - *Waste Management and Disposal*.
- .5 Construction Waste Management Plan (CWM Plan): Written plan addressing opportunities for reduction, reuse, or recycling of materials prepared in accordance with Section 01 74 19 - *Waste Management and Disposal*.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Demolition Meetings:
  - .1 Convene pre-installation meeting one (1) week prior to work of this Section, with PCA Project Manager, Government Representative in accordance with Section 01 31 19 - Project Meetings to:
    - .1 Verify project requirements.
    - .2 Verify existing site conditions adjacent to demolition work.
    - .3 Co-ordination with other construction subtrades.
  - .2 Hold project meetings every two (2) weeks.
  - .3 Ensure key personnel attend.
  - .4 Government Representative must provide written report on status of waste diversion activity at each meeting.
  - .5 Government Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.
- .2 Scheduling:
  - .1 Employ necessary means to meet project timelines without compromising specified minimum rates of material diversion.
    - .1 In event of unforeseen delay notify the Government Representative.

#### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures* and Section 01 74 19 - *Waste Management and Disposal*.
- .2 Ensure compliance with all requirements relating to the transmission of documents, samples and reports required.

- .3 Prior to beginning Work on site, submit a detail Waste Reduction Workplan in accordance with Section 01 74 19 – *Waste management and disposal* and indicate:
  - .1 Description of and anticipated quantities in percentages of materials to be salvaged reused, recycled and landfilled.
  - .2 Schedule of selective demolition.
  - .3 Number and location of dumpsters.
  - .4 Expected frequency of collection activity.
  - .5 Name and address of waste facilities or waste receiving organizations.
- .4 Every two weeks submit copies to the Government Representative of certified weigh bills from authorized disposal sites and reuse and recycling facilities for material removal from site.
- .5 Shop Drawings:
  - .1 Submit for review and approval demolition drawings, diagrams or details showing sequences of demolition work and supporting structures and underpinning and elements used to that end.
  - .2 Submit for review and approval, drawings, diagrams or details indicating the design of shoring, temporary retaining and underpinning structures and any other temporary equipment required to ensure the stability of the structures to be demolished.
  - .3 Submit demolition drawings stamped and signed by professional engineer registered to the Ordre des Ingénieurs du Québec.
- .6 Demolition plan:
  - .1 Submit a plan of demolition area indicating extent of temporary facilities and supports, methods of removal and demolition prepared, signed and sealed by a recognized professional engineer and member of the Ordre des ingénieurs du Québec.
- .7 Proposed Noise Control and Dust Control Measures:
  - .1 Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation.

## 1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: Ensure Work is performed in compliance with applicable Provincial/Territorial and Municipal regulations.
  - .1 Comply with hauling and disposal regulations of Authority Having Jurisdiction.

## 1.7 SITE CONDITIONS

- .1 Environmental protection:
  - .1 Ensure Work is done in accordance with Section 01 35 43 - *Environmental Procedures*.

- .2 Ensure Work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
- .3 Fires and burning of waste or materials is not permitted on site.
- .4 Do not bury rubbish waste materials.
- .5 Do not dispose of waste or volatile materials including but not limited to mineral spirits, oil, petroleum-based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.
  - .1 Ensure proper disposal procedures are maintained throughout project.
- .6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties.
- .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction and as directed by the Government Representative.
- .8 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .9 Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on all temporary roads.

## 1.8 EXISTING CONDITIONS

- .1 If material resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of demolition, stop work, take preventative measures, and notify the Government Representative immediately. Proceed only after written instructions have been received from the Government Representative.
- .2 Existing Conditions: Condition of materials identified as being salvaged or demolished are based on their observed condition at time of site examination before tendering
  - .1 Remove, protect and store salvaged items as directed by the Government Representative. Salvage items as identified by PCA Project Manager or by Government Representative. Deliver to the Government Representative as directed.

## Part 2 Products

### 2.1 EQUIPMENT

- .1 See Appendix 1 - Authorized demolition equipment.
- .2 Equipment and heavy machinery:
  - .1 Road vehicles must comply with the requirements of the Regulations Amending the Road Vehicle and Engine Emission Regulations, SOR / 2006-268, made under CEPA, the Road Vehicle and Engine Emission Regulations , SOR / 2003-2, made under CEPA.

- .2 Off-road vehicles must meet the requirements of EPA CFR 86.098-10 and EPA CFR 86.098-11.
- .3 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.
- .3 For fine demolition, use a manual air hammer weighing no more than 15 kg.
- .4 Demolition of concrete near the meeting point of 2 saw cuts must be carried out using a 7 kg manual air hammer.
- .5 For demolition of concrete in hollowed-out wall sections or within 150 mm of pipes:
  - .1 Hammer type: pneumatic or manual;
  - .2 Maximum mass: 7 kg;
  - .3 Hammer point: spade.
- .6 The Government Representative may request at any time to reduce the capacity of authorized demolition equipment when he judges that the demolition work is causing damage to the reinforcement or the concrete to be preserved.

### **Part 3 Execution**

#### **3.1 TEMPORARY SUPPORT STRUCTURES**

- .1 The design of temporary support structures required for demolition work, underpinning and other foundation supports required for the project must be carried out by a recognized competent engineer, member in good standing of the Ordre des ingénieurs du Québec.

#### **3.2 EXISTING CONDITIONS**

- .1 Identify and protect public service pipelines and ensure that those which are still in service are kept in good condition.
- .2 Notify utility companies and obtain necessary approvals from them before starting demolition work.
- .3 Disconnect, shut off or re-route, as required, existing public service pipes, which interfere with the execution of the work, in accordance with the requirements of the competent authorities. Locate the location of these pipes and those that had already been abandoned on the ground and indicate it (horizontal and vertical plans) on the drawings after execution. Support well, brace and hold in place the pipes and conduits encountered.
  - .1 Immediately inform the Representative of the Government as well as the public utility company concerned of any damage caused to a service pipeline intended to be kept.
  - .2 Immediately notify the Representative of the Government of the discovery of any unlisted public service pipeline and await his written instructions concerning the measures to be taken in this regard.

### 3.3 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
  - .1 Install sediment barriers made of a geotextile, in accordance with section 01 35 43 - *Environmental protection*.
  - .2 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
  - .3 Inspect, repair, and maintain erosion and sedimentation control measures during demolition.
  - .4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal after completion of demolition work.
- .2 Protection of existing structures:
  - .1 Perform work in accordance with section 01 35 29.06 - *Health and safety requirements*, 01 35 43 - *Environmental protection* and 01 56 00 - *Temporary barriers and enclosures*.
  - .2 Take the necessary measures to prevent the displacement or settlement of road surfaces, trees, landscaping, adjacent soils and properties, parts of the structure to be preserved and to prevent them from being damaged.
    - .1 Provide bracing, shoring and underpinning as required.
    - .2 Repair damage caused by demolition as directed by the Government Representative.
  - .3 Support affected structures and, if safety of structure being demolished adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify the Government Representative.
  - .4 Prevent debris from blocking surface drainage system, elevators, mechanical and electrical systems which must remain in operation.

### 3.4 DEMOLITION

- .1 Do demolition work using temporary access structures and containment enclosures as required, in accordance with Section 01 56 00 - *Temporary Barriers and Enclosures*.
- .2 Blasting operations not permitted during demolition.
- .3 Remove contaminated or dangerous materials as defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.
- .4 Prior to start of Work, evacuate contaminated or dangerous materials from the site according to the directives of the Government Representative and eliminate them by transporting them to the facilities designated for this purpose, according to safe methods, and in accordance with federal, provincial regulations. and municipal in force on the territory of the City of Montreal.

- .5 Demolish structures as indicated on drawings
- .6 Carry out the demolition work necessary to allow the execution of the work indicated in the plans.
- .7 Recover for recycling all concrete debris produced during demolition work.
- .8 At end of each day's work, leave Work in safe and stable condition.
- .9 Demolish to minimize dusting. Keep materials wetted as directed by the Government Representative.
- .10 Remove structural framing as indicated in the Specifications, Plans and as directed by the Government Representative.
- .11 Only dispose of material specified by selected alternative disposal option as directed by PCA Project Manager and the Government Representative.
- .12 Except where noted otherwise, remove and dispose of demolished materials in accordance with authorities having jurisdiction.
- .13 Bituminous pavement removal:
  - .1 Prepare a Work Plan for bituminous pavement removal at locations indicated in the drawings; submit Work Plan at least ten (10) days prior to start of work;
    - .1 Include in the Work Plan all equipment, materials and methods proposed to perform saw cuts, remove bituminous pavement, repair surface of slab, etc.
  - .2 Delineate with saw cut the area of bituminous pavement to be removed on the approach and the deck;
  - .3 Remove bituminous pavement delineated by the cut;
  - .4 Remove waterproofing membrane where necessary;
  - .5 Clean slab surface with wet abrasive blasting or high-pressure waterjet;
  - .6 Clean site at end of work;
  - .7 Recover and treat demolition and cleaning materials in accordance with Section 01 74 19 – *Waste management and disposal*.

### 3.5 CLEANING

- .1 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 19 - *Waste Management and Removal*.
- .2 Waste management: sort waste for recycling.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .3 Divert excess materials from landfill to site approved by the Government Representative.
- .4 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

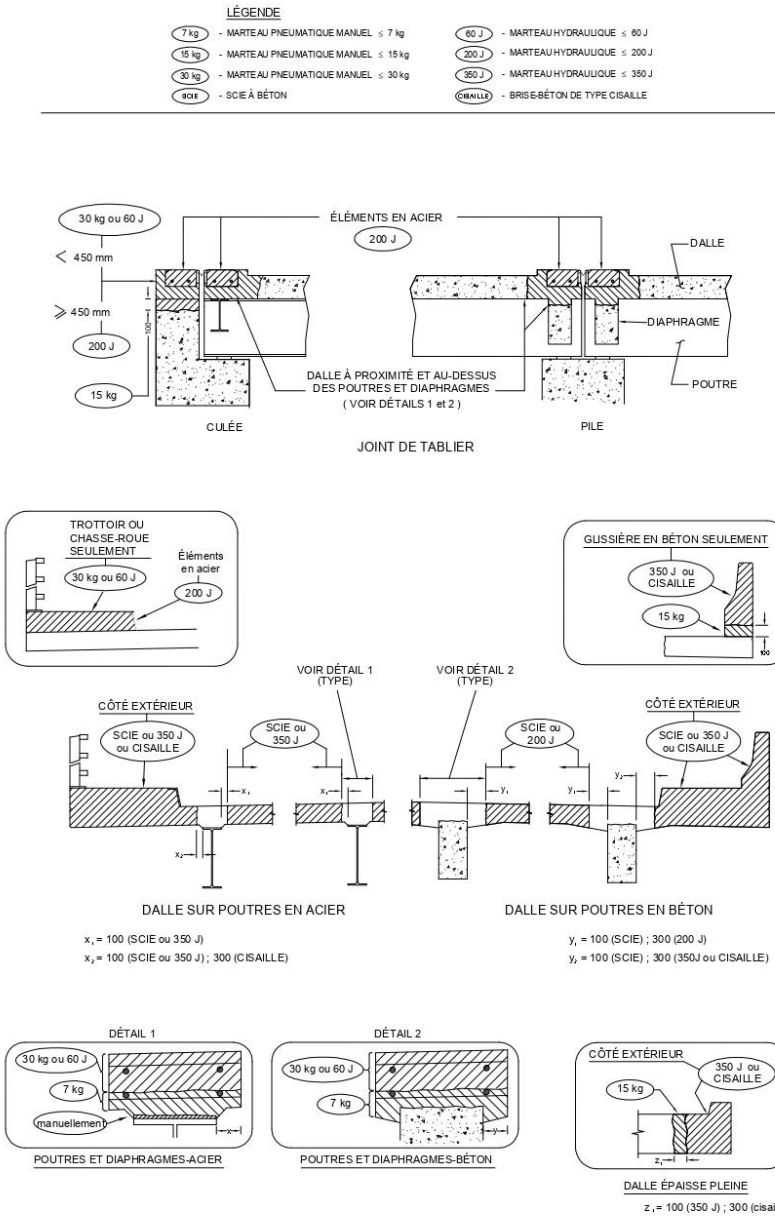
- .5 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.
  - .1 Label stockpiles, indicating material type and quantity.
- .6 Supply separate, clearly marked disposal bins for categories of waste material. Do not remove bins from site until inspected and approved by the Government Representative.
- .7 Remove stockpiled material as directed by the Government Representative, when it interferes with operations of project construction.
- .8 Remove stockpiles of like materials using an ecological disposal option once collection of materials is complete.
- .9 Dispose of materials not designated for ecological disposal in accordance with applicable regulations.

**END OF SECTION**

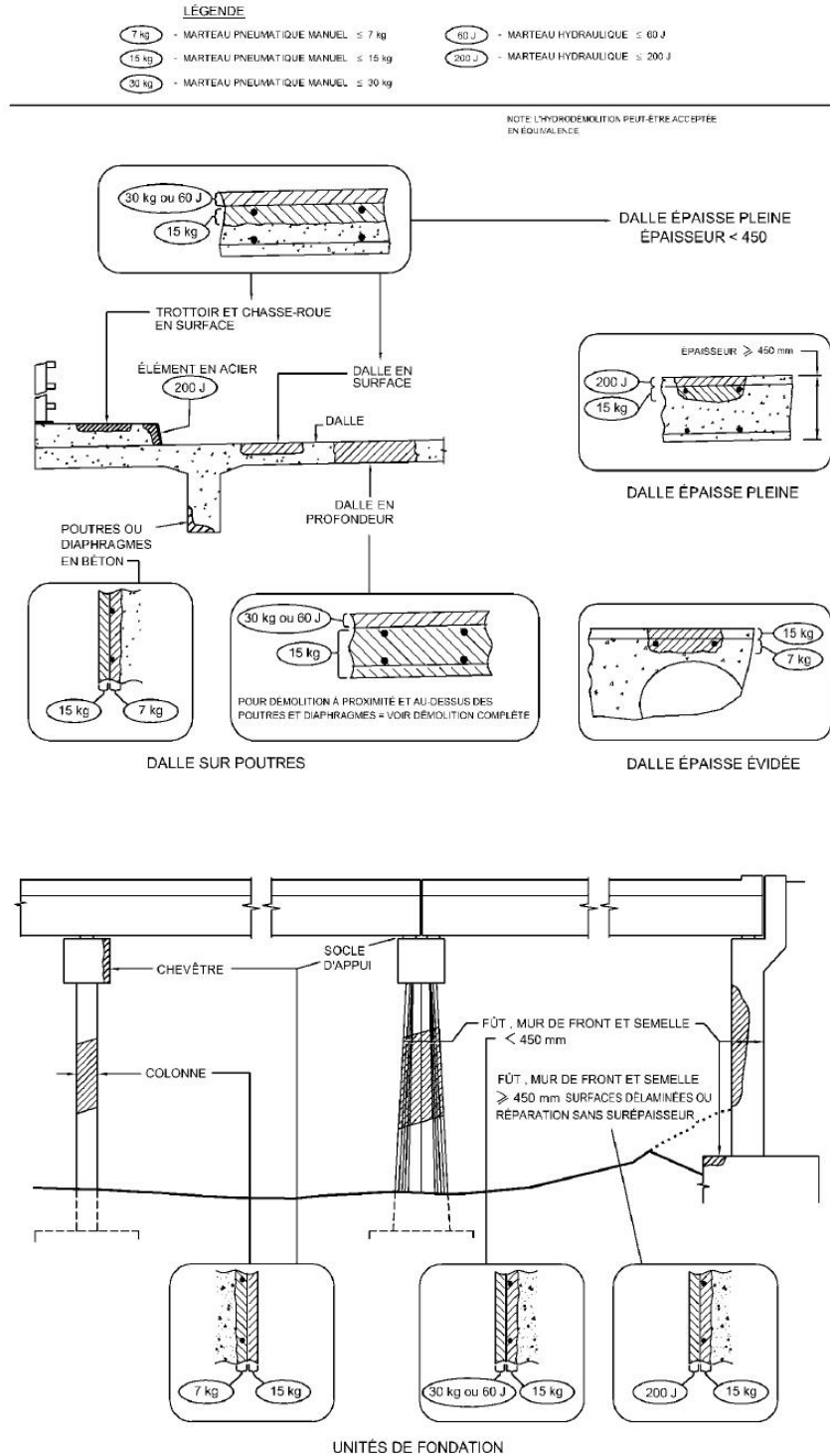
## APPENDIX 1

### Authorized demolition equipment

#### Appendix : Authorized demolition equipment







Partial demolition

**Part 1 General**

**1.1 SUMMARY**

- .1 Comply with requirements of this Section when performing following Work:
  - .1 Removal of lead-based paint as indicated on drawings using power tools with an effective dust collection system equipped with HEPA filter.
  - .2 Abrasive blasting of lead-based paint on as indicated on drawings.
  - .3 Removal of lead-containing dust using air mist extraction system.

**1.2 RELATED REQUIREMENTS**

- .1 Not used.

**1.3 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 CAN/CSA Z180.1-00 (R2005), Compressed Breathing Air and Systems.
- .2 Department of Justice Canada
  - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .3 Health Canada
  - .1 Workplace Hazardous Materials Information System (WHMIS).
    - .1 Safety Data Sheets (SDS).
- .4 Human Resources and Social Development Canada (HRSDC)
  - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .5 Transport Canada (TC)
  - .1 Transportation of Dangerous Goods Act, 1992 (TDGA).
- .6 U.S. Environmental Protection Agency (EPA)
  - .1 EPA 747-R-95-007-1995, Sampling House Dust for Lead.
- .7 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
  - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM), 4th Edition (1994).
- .8 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
  - .1 Lead in Construction Regulation - 29 CFR 1926.62-1993.
- .9 Underwriters Laboratories of Canada (ULC)

- .10 Province of Quebec
  - .1 An Act Respecting Occupational Health and Safety, R.S.Q., c.S-2.1 (current edition) - Updated 2005.

#### 1.4 DEFINITIONS

- .1 HEPA vacuum: High Efficiency Particulate Air filtered vacuum equipment with a filter system capable of collecting and retaining fibres greater than 0.3 microns in any direction at 99.97% efficiency.
- .2 Authorized Visitors: Parks Canada Agency, Government Representative and designated representatives of regulatory agencies.
- .3 Occupied Area: area of building or work site outside Work Area.
- .4 Dioctyl Phthalate (DOP) Test: testing method used to evaluate particle penetration and air flow resistance properties of filtration materials - HEPA filter leak test.
- .5 Sprayer: garden reservoir type sprayer or airless spray equipment capable of producing mist or fine spray. Appropriate capacity for scope of work.
- .6 Airlock: ingress or egress system without permitting air movement between contaminated area and uncontaminated area. Consisting of two curtained doorways at least 2 m apart.
- .7 Curtained doorway: arrangement of closures to allow ingress and egress from one room to another while permitting minimal air movement between rooms, typically constructed as follows:
  - .1 Place two overlapping sheets of polyethylene over existing or temporarily framed doorway, secure each along top of doorway, secure vertical edge of one sheet along one vertical side of doorway, and secure vertical edge of other sheet along opposite vertical side of doorway.
  - .2 Reinforce free edges of polyethylene with duct tape and add weight to bottom edge to ensure proper closing.
  - .3 Overlap each polyethylene sheet at openings 1.5 m on each side.
- .8 Action level: employee exposure, without regard to usage of respirators, to an airborne concentration of lead of 50 micrograms per cubic metre of air calculated as an 8-hour time-weighted average (TWA). Maximum precautions for lead abatement are based on airborne lead concentrations greater than 1.25 milligrams per cubic metre of air within Work Area.
- .9 Competent person: individuals capable of identifying existing lead hazards in workplace and taking corrective measures to eliminate them.
- .10 Lead in Dust: wipe sampling on the vertical and/or horizontal surfaces, dust and debris is considered to be lead contaminated if it contains more than 40 micrograms of lead in dust per square foot.
- .11 Negative Air Pressure Machine: extracts air directly from work area and filters extracted air through a HEPA filter, discharge air to exterior of building.
  - .1 Maintain pressure differential of 5 to 7 Pa relative to adjacent areas outside of work areas. Machine to be equipped with alarm to warn of system breakdown and

equipped with instrument to continuously monitor and automatically record pressure differences.

## 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Provide proof satisfactory to Government Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide: Provincial requirements for Notice of Project Form.
- .4 Provide proof of Contractor s General and Environmental Liability Insurance.
- .5 Quality Control:
  - .1 Provide Government Representative necessary permits for transportation and disposal of lead based paint waste and proof it has been received and properly disposed.
  - .2 Provide proof satisfactory to Government Representative that employees had instruction on hazards of lead exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.
  - .3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two days duration, approved by Government Representative. Minimum of one supervisor for every ten workers.
- .6 Product data:
  - .1 Provide documentation including test results, fire and flammability data, and WHMIS Safety Data Sheets (SDS) for chemicals or materials including:
    - .1 Encapsulants.
    - .2 Amended water.
    - .3 Slow drying sealer.

## 1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead, in case of conflict among those requirements or with these specifications the more stringent requirement applies. Comply with regulations in effect at time work is performed.
- .2 Health and Safety:
  - .1 Require construction work to be in compliance with the occupational health and safety regulations in 01 35 29.06 - *Health and Safety Requirements*.
  - .2 Safety Requirements: worker and visitor protection.
    - .1 Protective equipment and clothing to be worn by workers while in Lead Work Area includes:
      - .1 Leads removal using power tool: respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of [50], acceptable to Authority having jurisdiction. Suitable for type

- of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.
- .2 Abrasive blasting of lead paint: NIOSH approved and equipped with filter cartridges with assigned protection factor of [1000], acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Respirator to be equivalent Type CE abrasive blast supplied air respirator operated in a pressure demand or positive pressure mode with a tight-fitting [full-face-piece] [half-mask]. Compressed air used to supply supplied air respirators to meet breathing air purity requirements of CAN/CSA Z180.1. Where an oil-lubricated compressor is used to supply breathing air, a continuous carbon monoxide monitor/alarm to be provided.
  - .3 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
- .2 Requirements for workers:
- .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
  - .2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using soap and water before removing from work area or from Equipment and Access Room.
  - .3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers do not use this system as means to leave or enter Work Area.
- .3 Eating, drinking, chewing, and smoking are not permitted in Work Area.
  - .4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.
  - .5 Ensure workers wash hands and face when leaving Lead Work Area. Facilities for washing are located [as indicated on drawings].

- .6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.
- .7 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.
- .8 Visitor Protection:
  - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
  - .2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.
  - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

### **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for reuse/recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
- .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 Disposal of lead waste generated by removal activities must comply with Provincial, Municipal and Federal regulations. Dispose of lead waste in sealed leak proof drums. Label containers with appropriate warning labels.
- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

### **1.8 EXISTING CONDITIONS**

- .1 Reports and information pertaining to lead based paint to be handled, removed, or otherwise disturbed and disposed of during this Project are annexed at the end of this Section.
- .2 Notify Government Representative of lead-based paint discovered during Work and not apparent from drawings, specifications, or report pertaining to Work. Do not disturb such material until instructed by Government Representative.

### **1.9 SCHEDULING**

- .1 No later than two (2) days before beginning Work on this Project notify the following in writing; where appropriate.
  - .1 Appropriate Regional or Zone Director of Medical Services Branch, Health Canada.
  - .2 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide Government Representative copy of notifications prior to start of Work.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Polyethylene 0.15 mm unless otherwise specified; in sheet size to minimize joints.
- .2 FR polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass-reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .4 Slow-drying sealer: non-staining, clear, water - dispersible type that remains tacky on surface for at least 8 hours and designed for trapping residual lead paint residue.
- .5 Lead waste containers: metal type acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.
  - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

## **Part 3 Execution**

### **3.1 SUPERVISION**

- .1 Approved Supervisor must remain within Work Area during disturbance, removal, or handling of lead-based paints.

### **3.2 PREPARATION**

- .1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by Government Representative.
- .2 Work Area:
  - .1 Shut off and isolate HVAC system to prevent lead dust and particulate dispersal into other building areas. Conduct smoke tests to ensure duct work is airtight.
  - .2 Pre-clean fixed casework, and equipment within work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.
  - .3 Clean work areas using HEPA vacuum. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.
  - .4 Install negative pressure machine system and operate continuously from installation of polyethylene sheeting until completion of final cleanup. Provide automatic continuous monitoring and recording instrument of pressure difference.
  - .5 Seal off openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.
  - .6 Cover floor surfaces in work area from wall to wall with FR polyethylene drop sheets to protect existing floor during removal.



- .7 Build airlocks at entrances and exits from work areas to ensure work areas are always closed off by one curtained doorway when workers enter or exit.
  - .8 At point of access to work areas install warning signs in both official languages in upper case Helvetica Medium letters reading as follows where number in parentheses indicates font size to be used:
    - .1 CAUTION – LEAD HAZARD AREA – DANGER (25 mm).
    - .2 NO UNAUTHORIZED ENTRY (19 mm)
    - .3 WEAR ASSIGNED PROTECTIVE EQUIPMENT AND RESPIRATOR (19 mm).
    - .4 BREATHING LEAD CONTAMINATED DUST CAUSES SERIOUS BODILY HARM (7 mm).
  - .9 Maintain emergency and fire exits from work areas, or establish alternative exits satisfactory to Authority having jurisdiction.
  - .10 Where water application is required for wetting lead containing materials, provide temporary water supply by use of appropriately sized hoses for application of water as required.
  - .11 Provide electrical power and shut off for operation of powered tools and equipment. Provide 24 volt safety lighting and ground fault interrupter circuits on power source for electrical tools, in accordance with applicable CSA Standard. Ensure safe installation of electrical lines and equipment.
- .3 Worker Decontamination Enclosure System:
- .1 Worker Decontamination Enclosure System includes Equipment and Access Room and Clean Room, as follows:
    - .1 Equipment and Access Room: construct between exit and work areas, with two curtained doorways, one to the rest of the suite, and one to work area. Install waste receptor and storage facilities for workers shoes and protective clothing to be re-worn in work areas. Build large enough to accommodate specified facilities, equipment needed, and at least one worker allowing enough space to change comfortably.
    - .2 Clean Room: construct with curtained doorway to outside of enclosures. Provide lockers or hangers and hooks for workers street clothes and personal belongings. Provide storage for clean protective clothing and respiratory equipment. Install mirror to permit workers to fit respiratory equipment properly.
- .4 Construction of Decontamination Enclosures:
- .1 Construct framing for enclosures or use existing rooms. Line enclosure with polyethylene sheeting and seal with tape, apply two layers of FR polyethylene on floor.
  - .2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closure comprising doorway always remains closed.
  - .3 Shower room in decontamination facility to be provided with the following:



- .1 Hot and cold water or water of constant temperature not less than 40 degrees Celsius or more than 50 degrees Celsius.
- .2 Individual controls inside to regulate water flow and temperature.
- .4 Prior to each shift in which a decontamination facility is being used, a competent person should inspect the facility to ensure that there are no defects that would allow lead-containing dust to escape. Defects should be repaired before the facility is used. The decontamination facility should be maintained in a clean and sanitary condition.
- .5 Separation of Work Areas from Occupied Areas:
  - .1 Barriers between Work Area and occupied area to be constructed as follows:
    - .1 Construct floor to ceiling [metal] [lumber] stud framing, cover with polyethylene sheeting and seal with duct tape. Apply [9] plywood over polyethylene sheeting. Seal plywood joints and between adjacent materials with surface film forming sealer, to create airtight barrier.
    - .2 Cover plywood with polyethylene sheeting and sealed with duct tape.
- .6 Maintenance of Enclosures:
  - .1 Maintain enclosures in tidy condition.
  - .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
  - .3 Visually inspect enclosures at beginning of each working day.
  - .4 Use smoke test method to test effectiveness of barriers as directed by Government Representative.

### 3.3 LEAD-BASE PAINT ABATEMENT

- .1 Removal of lead-based paint to be performed using power tools that are attached to dust-collecting vacuums with HEPA filters.
- .2 Remove lead-based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .3 Wet method to be used to reduce dust generation. Examples of wet methods include wetting surfaces, wet scraping, and wet shovelling. Wet method is not used if it creates a hazard or cause damage to equipment or to project. Power tools to be equipped with a shroud, and to be kept flush with surface.
- .4 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove immediate from working area to staging area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .5 After completion of stripping work, wire brush and wet sponge surface to remove visible material. During this work keep surfaces wet. After wire brushing and wet sponging, wet clean and HEPA vacuum entire work area including Equipment and Access Room. Compressed air or dry sweeping is not used to clean up lead-containing dust or waste. After

inspection and approval by Government Representative apply continuous coat of slow drying sealer to surfaces. Do not disturb work area for (8) hours, no entry, activity, or ventilation other than operation negative air machine during this period.

- .6 After enclosing lead painted surfaces, wet clean work area and equipment and access room. During settling period no entry, activity, or ventilation will be permitted.

### 3.4 INSPECTION

- .1 Perform inspection to confirm compliance with specification and governing authority requirements. Deviations from requirements not been approved in writing by Government Representative will result in Work shutdown, at no cost to PCA.
- .2 Government Representative will inspect work for:
  - .1 Adherence to specific procedures and materials.
  - .2 Final cleanliness and completion.
  - .3 No additional costs will be allowed for additional labour or materials required to provide specified performance level.
- .3 When lead dust leakage from Work Area occurs Government Representative will order Work shutdown.
  - .1 No additional costs will be allowed by Contractor for additional labour or materials required to provide specified performance level.

### 3.5 LEAD SURFACE SAMPLING - WORK AREAS

- .1 Final lead surface sampling conducted as follows:
  - .1 After Work Area has passed a visual inspection for cleanliness approved by Government Representative and acceptable coat of lock-down agent has been applied to surfaces within enclosure, and appropriate setting period of 8 hours has passed, Government Representative will perform lead wipe sampling in Work Area.
    - .1 Final lead wipe sampling results from horizontal and vertical surfaces must show lead levels of less than 40 micrograms of lead in dust per square foot. Samples collected and analyzed in accordance with EPA 747-R-95-007.
    - .2 If wipe sampling results show levels of lead dust in excess of 40 micrograms per square foot, re-clean work area at contractor s expense and apply another acceptable coat of lock-down agent to surfaces.
    - .3 Repeat as necessary until lead dust levels are less than 40 micrograms per square foot.

### 3.6 FINAL CLEANUP

- .1 Following specified cleaning procedures, and when lead wipe sampling is below acceptable concentrations proceed with final cleanup.

- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.
- .4 Clean up Work areas, Equipment and Access Room, and other contaminated enclosures.
- .5 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

### **3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS**

- .1 Repair or replace objects damaged in course of work to their original state or better, as directed by Government Representative.

**END OF SECTION**

**ANNEX 1**

**Analyses de peintures des ponts Gauron (7) et Lafleur (7A)**



## RAPPORT D'INTERVENTION

Dossier n° :	010-P-0002065-0-00-100-02-MC-0001-00	Date d'intervention : Le 25 mars 2013
Client/Entrepreneur :	Agence Parcs Canada Unité de gestion de l'Ouest du Québec a/s M. René Bernard, ing. (rene.bernard@pc.gc.ca)	Lieu d'intervention : <b>Ponts 7 et 7A</b> Ville Lasalle (Montréal)
Nom du projet :	<b>Ponts Lafleur et Gauron, Ville Lasalle</b> <b>Prélèvement de peinture</b> <b>Analyse de la teneur en plomb</b>	
Type d'intervention :	<input checked="" type="checkbox"/> validation <input type="checkbox"/> relance <input type="checkbox"/> rencontre <input type="checkbox"/> autres	Interlocuteur : Cellulaire :
<i>autres – spécifiez :</i>		

**RÉSUMÉ : PRÉLÈVEMENT D'ÉCHANTILLONS DE PEINTURE SUR LA STRUCTURE DES PONTS LAFLEUR ET GAURON DANS L'ARRONDISSEMENT VILLE LASALLE À MONTRÉAL**

Le 25 mars 2013, nous sommes intervenus aux ponts Lafleur et Gauron, dans l'arrondissement Ville Lasalle à Montréal, pour prélever des échantillons de peinture sur la structure d'acier dans le but de caractériser la teneur en plomb de la peinture.

Notre mandat consistait à prélever des échantillons de peinture pour vérifier si du plomb était présent dans les éléments de la charpente métallique et de déterminer si ces éléments doivent faire l'objet d'un traitement particulier lors du démantèlement et de la mise au rebut.



Ponts Lafleur et Gauron sur les avenues St-Pierre et Dollard



## RAPPORT D'INTERVENTION

### Méthode et emplacement des échantillons prélevés

Afin d'obtenir une vue d'ensemble de la peinture, nous avons prélevé nos échantillons à trois emplacements différents sur chacun des ponts. Un échantillon par pont a été prélevé. Chaque échantillon représente donc le cumulatif de trois emplacements différents sur chacun des ponts.

En somme, deux échantillons ont été prélevés :

1. Échantillon du pont ave. St-Pierre/ave. Dollard direction sud;
2. Échantillon du pont ave. St-Pierre/ave. Dollard direction nord

La méthode utilisée pour les prélèvements est la suivante :

Au décapant en pâte pour peinture de marque Circa 1850

Échantillonnage par voix humide.

Les échantillons ont été prélevés à partir de différents éléments de la charpente métallique, c'est-à-dire les colonnes, les diagonales et les plaques de renfort (voir photos).



Échantillon avant prélèvement (pont ave. St-Pierre/ave. Dollard direction sud) pris depuis les plaques de renfort



Échantillon avant prélèvement (pont ave. St-Pierre/ave. Dollard direction nord) pris depuis les plaques de renfort et une colonne





## RAPPORT D'INTERVENTION

### Aspect visuel de la peinture sur la structure d'acier

Nous avons observé que la peinture était de couleur turquoise sur la structure d'acier. Quelques marques de corrosion étaient présentes sur les éléments d'acier. La peinture était fortement liée à la structure. De ce fait, il nous a été impossible de prélever des échantillons secs.

Lors de nos prélèvements, une attention particulière a été apportée à prélever de la peinture jusqu'au métal sain, c'est-à-dire avec l'apprêt de la peinture. Notre méthode d'échantillonnage par voie humide (décapant) ne nous a pas révélé la présence d'un apprêt de peinture. Les photos suivantes démontrent les surfaces de peinture à la suite de nos prélèvements.



Échantillon après prélèvement (pont ave. St-Pierre/ave. Dollard direction sud) pris depuis les plaques de renfort



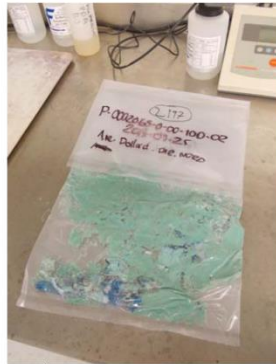
Échantillon après prélèvement (pont ave. St-Pierre/ave. Dollard direction nord) pris depuis les plaques de renfort et une poutre



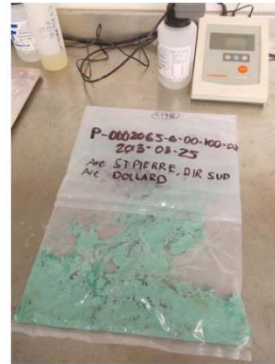
## RAPPORT D'INTERVENTION

### Résultat d'analyse

L'analyse de la teneur en plomb a été effectuée par spectrophotométrie à absorption atomique et les teneurs en plomb sont de l'ordre de 0.72 à 1.88%.



Échantillon de peinture  
(pont ave. St-Pierre/ave. Dollard direction  
nord)



Échantillon de peinture  
(pont ave. St-Pierre/ave. Dollard direction  
Sud)

### Conclusion et recommandations

Normalement, les poutres recouvertes de peinture au plomb sont considérées comme des déchets dangereux et doivent être traitées avant la mise au rebut. Selon l'EPA (Environmental Protection Agency), on appelle une peinture au plomb, toute peinture présentant une concentration égale ou supérieure à  $1,0 \text{ mg/cm}^2$  ou 0,5% par masse. À partir de ce moment, l'enlèvement du revêtement devrait suivre la procédure émise par l'OSHA (Occupational Safety and Health Administration).

Suivant ces résultats, un enlèvement du revêtement par jet d'abrasif, le cas échéant, entraînera un dépassement de la valeur maximale de la teneur en plomb établie par la Loi sur la santé et la sécurité du travail c. S-2.1, r.19.01. Par conséquent, les travaux doivent être réalisés conformément à la Loi sur la santé et la sécurité du travail (L.R.Q., c. S-2.1) et la Loi sur la qualité de l'environnement (L.R.Q., c. Q-2).


Les résidus liquides ou solides qui seront récupérés devront être traités suivant le règlement sur les matières dangereuses (Décret 1310-97, du 8 octobre 1997) (Québec) sans mesures particulières requises lors de la présence de plomb.





## RAPPORT D'INTERVENTION

/ab

<b>Observations importantes :</b> <b>La teneur en plomb de la peinture prélevée sur les éléments de la charpente métallique des ponts Lafleur et Gauron est de l'ordre de &lt;0,01%.</b>	
Technicien : Keven Pelletier, ing. jr O.I.Q. n° 5027078 CSA W178.2 niveau 1	Date : Le 3 avril 2013
Vérifié par :   Bernard Perron, B. Ens. Certifié NACE Directeur de projets Superviseur CSA W178.2 niveau 3 n° 746	Date : Le 3 avril 2013
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**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 All sections of de Division 01 – *General Requirements*
- .2 Section 02 41 16 – *Structural demolition.*
- .3 Section 03 20 00 – *Concrete Reinforcing*
- .4 Section 03 30 00 – *Cast-in-place Concrete*
- .5 Section 03 30 03 – *Concrete Repairs*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA)
  - .1 CSA A23.1/A23.2, latest edition, *Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.*
  - .2 CAN/CSA O86 latest edition, *Engineering Design in Wood.*
  - .3 CSA O121, latest edition, *Douglas Fir Plywood.*
  - .4 CSA O151, latest edition, *Canadian Softwood Plywood.*
  - .5 CSA O153, latest edition, *Poplar Plywood.*
  - .6 CAN/CSA O325.0 latest edition, *Construction Sheathing.*
  - .7 CSA S269.1, latest edition, *Falsework and Formwork.*
  - .8 CAN/CSA S269.3, latest edition, *Concrete Formwork.*
- .2 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S701, latest edition, *Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.*
- .3 Ministère des Transports du Québec
  - .1 *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation*
  - .2 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3101, *Béton de masses volumiques normales.*
  - .3 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3501, *Matériaux de cure.*
  - .4 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3801, *Mortiers cimentaires en sac.*
  - .5 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3901, *Coulis cimentaires.*

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Submit shop drawings for formwork and falsework.

- .1 Submit drawings stamped and signed by professional engineer registered with the Ordre des Ingénieurs du Québec (OIQ).
- .2 The shop drawings must indicate, show or understand the construction method and the work schedule, the procedure to follow regarding the shoring, stripping and replacement of the shoring, the materials, the particular architectural characteristics of the finished visible surfaces, the arrangement of joints, tie rods and lining elements, and the location of temporary embedded parts. Comply with CSA standard S269.1 relative to the drawings of temporary shoring structures. Comply with standard CAN / CSA S269.3 relative to the formwork drawings.
- .3 The shop drawings must indicate, show or understand the formwork calculation data such as the speed and admissible temperature for placing concrete in the formwork.
- .4 Specify the order of assembly and disassembly of formwork and temporary shoring, as directed by the Government Representative.
- .3 After construction, after inspection and before concreting, provide the Government Representative with a written notice, signed by a member of the Ordre des ingénieurs du Québec, indicating that the formwork and temporary shoring built conforms to plans submitted. This notice must state the date and time of the inspection.
- .4 Submit technical sheets for temporary formwork and shoring.
  - .1 Submit, to the Representative of the Government, the required technical sheets as well as the manufacturer's documentation concerning the formwork tie rods, the form release agent and any other product necessary for formwork and temporary shoring works. The technical sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits and the finish.
- .5 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CSA S269.3 for formwork drawings.
- .6 Specify the order of assembly and disassembly of the formwork and temporary shoring works, in accordance with the directives of the Government Representative.
- .7 Submit the required material safety data sheets, compliant with the Workplace Hazardous Materials Information System (WHMIS), according to Section 01 35 29.06 - *Health and Safety requirements* and Section 01 35 43 - *Environmental Procedures*.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - *Common Product Requirements*.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer s name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect formwork from damages.

- .3 Replace defective or damaged materials with new.
- .4 Waste management and disposal:
  - .1 Separate waste materials for reuse/recycling in accordance with Section 01 74 19 – *Waste management and disposal*.
  - .2 Place materials defined as hazardous or toxic in designated containers.
  - .3 Divert wood materials from landfill to a recycling facility as approved by the Government Representative.
  - .4 Divert plastic materials from landfill to a facility as approved by the Government Representative.
  - .5 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Government Representative.

## 1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Sort waste for reuse / reprocess and recycling in accordance with section 01 74 19 - *Waste Management and Disposal*.
- .2 Place in designated containers substances that meet the definition of toxic or hazardous waste.
- .3 Route unused wood to a recycling facility authorized by the Government Representative.
- .4 Send unused plastic to a facility authorized by the Government Representative.
- .5 Route unused formwork agents to an approved hazardous materials collection site, authorized by the Government Representative.

## Part 2 Products

### 2.1 MATERIALS / EQUIPMENT

- .1 Formwork materials:
  - .1 For concrete without special architectural features, use wood and wood product formwork materials to CSA O121, latest edition.
  - .2 For concrete with special architectural features, use formwork materials to CSA A23.1/A23.2.
- .2 Form ties:
  - .1 For concrete not designated Architectural: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes minimum 25 mm diameter in concrete surface.
  - .2 For Architectural concrete; snap ties complete with plastic cones and light grey concrete plugs.
- .3 Form release agent: non-toxic, biodegradable and low VOC.
  - .1 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 70 and 110s Saybolt Universal at 40 degrees C, flashpoint minimum 150 degrees C, open cup.

- .4 Materials for temporary shoring works: in accordance with standard CSA S269.1, latest version.

### **Part 3 Execution**

#### **3.1 FABRICATION AND ERECTION**

- .1 Verify lines, levels, and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain Government Representative's approval for use of earth forms framing openings not indicated on drawings.
- .3 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .4 Fabricate and erect falsework in accordance with CSA S269.1, latest edition.
- .5 Do not place shores and mud sills on frozen ground.
- .6 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .7 Fabricate and erect formwork in accordance with CAN/CSA S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA A23.1/A23.2. Align form joints and make watertight.
  - .1 Keep form joints to minimum.
- .8 Use 15 mm chamfer strips on external corners and 15 mm fillets at interior corners, joints, unless specified otherwise.
- .9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .10 Construct forms for architectural concrete, and place ties [as indicated] [as directed].
  - .1 Joint pattern not necessarily based on using standard size panels or maximum permissible spacing of ties.
- .11 Coat interior of formwork with a marketed form release agent designed to prevent concrete from sticking.
- .12 Coat forms prior to installation in accordance with the application rate specified in the product's technical data sheet. The form release agent must not come into contact with reinforcing steel.
- .13 Determine the pouring level by top of formwork or with molding.
- .14 Before placing concrete, clean formwork in accordance with CSA-A23.1/A23.2, latest edition.
  - .1 Clean formwork with compressed air, pressurized water or vacuum cleaner to remove ice, snow or other foreign matter
  - .2 If using compressed air, use equipment with a filter to trap oil. Demonstrate the effectiveness of this equipment before use.
  - .3 For concrete, use mixing water that complies with CSA-A23.1/A23.2, latest edition, for cleaning formwork.

### 3.2 REMOVAL AND RESHORING

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 Seven (7) days for the underside of slabs and decks.
  - .2 Seven (7) days for footings and abutments.
- .2 Remove formwork when concrete has reached 70 % of its 28 days design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 Formwork is considered removed when they come loose, and a part of the formwork is no longer in contact.
- .4 The requirements for curing concrete must apply as the formwork is removed if they are removed before the curing period ends, in accordance with sections 03 30 00 – *Cast-in-place Concrete* and 03 30 03 - *Concrete Repairs*.

### 3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 All sections of de Division 01 – *General Requirements*
- .2 Section 03 10 00 *Concrete Forming*
- .3 Section 03 30 00 *Cast-in-place Concrete*
- .4 Section 03 30 03 *Concrete Repairs*

**1.2 REFERENCE STANDARDS**

- .1 American Concrete Institute (ACI)
  - .1 SP-66, ACI Detailing Manual 2004.
- .2 ASTM International (ASTM)
  - .1 ASTM A82/A82M, latest edition, *Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.*
  - .2 ASTM A143/A143M, latest edition, *Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.*
  - .3 ASTM A185/A185M, latest edition, *Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.*
  - .4 ASTM A775/A775M, latest edition , *Standard Specification for Epoxy-Coated Reinforcing Steel Bars.*
- .3 CSA Group (CSA)
  - .1 CSA A23.1/A23.2, latest edition , *Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.*
  - .2 CAN/CSA A23.3, latest edition , *Design of Concrete Structures.*
  - .3 CSA G30.18, latest edition , *Carbon Steel Bars for Concrete Reinforcement.*
  - .4 CSA G40.20/G40.21, latest edition , *General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.*
  - .5 CAN/CSA-G164, latest edition, *Hot Dip Galvanizing of Irregularly Shaped Articles.*
  - .6 CSA W186, latest edition , *Welding of Reinforcing Bars in Reinforced Concrete Construction.*
- .4 Reinforcing Steel Institute of Canada (RSIC)
  - .1 RSIC, latest edition, *Reinforcing Steel Manual of Standard Practice.*
- .5 Ministère des Transports du Québec
  - .1 *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation*, latest edition.

- .2 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 5101, *Armatures pour les ouvrages de béton*, latest edition.

### 1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Reinforcement drawings must be executed in accordance with the Recommended Standards Manual, published by the RSIC.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer with the Ordre des Ingénieurs du Québec (OIQ).
    - .1 Indicate placing of reinforcement and:
      - .1 Rebars bending details.
      - .2 List of rebars.
      - .3 Quantities of reinforcement.
      - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Government Representative. The reinforcements shown must be marked according to an identification code allowing their location to be identified without the need to consult the structural drawings.
      - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
    - .2 Detail lap lengths and bar development lengths to CAN/CSA A23.3, unless otherwise indicated.
  - .4 Submit the technical sheets of the reinforcements.
  - .5 Submit, to the Government Representative, the required technical data sheets as well as the manufacturer's documentation concerning the wire mesh, the galvanizing touch-up product and all other necessary products. The technical sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits and the finish.
  - .6 Submit in writing to the Representative of the Government, at least two (2) weeks before delivery of the reinforcement to the site, the proposed source of supply for the reinforcement materials to be supplied.

### 1.4 QUALITY ASSURANCE

- .1 Quality assurance:
  - .1 Submit in writing to the Government Representative the proposed source of reinforcement material to be supplied.

### 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer s written instructions and 01 61 00 - *Common Product Requirements*.
- .2 Delivery and Acceptance Requirements:



- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Waste management and disposal
  - .1 Develop a construction waste reduction plan for the work covered by this section, in accordance with section 01 74 19 - *Waste Management and Disposal*.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Galvanized reinforcing:
  - .1 The reinforcing steel must be galvanized;
  - .2 Ensure that the reinforcements are free of dirt, earth, paint, splashes of hardened concrete from previous concreting, oil and free of rust sheets on their surface;
  - .3 Ensure that the reinforcements to be used are not deformed or bent;
  - .4 Any replacement of rebar with bars of different dimensions must be authorized in writing by the Departmental Representative;
  - .5 Unless otherwise specified, high-grip bars made of billet steel, 400W grade, must comply with CSA G30.18 standard;
  - .6 High adhesion bars in low alloy weldable steel, must comply with standard CSA G30.18.
- .2 Galvanized reinforcing wire:
  - .1 Steel wire must be annealed and cold drawn in accordance with ASTM A82 / A82M;
  - .2 High adhesion steel wire must comply with ASTM A82 / A82M standard;
  - .3 Steel wire used with galvanized reinforcement must be galvanized
- .3 Galvanized reinforcing mesh:
  - .1 The mesh must be galvanized;
  - .2 The steel wire used with the galvanized mesh must also be galvanized;
  - .3 The welded wire reinforcement mesh must comply with ASTM A185 / A185M;
  - .4 The high-adhesion wire reinforcement mesh must comply with ASTM A82 / A82M standard;
  - .5 The mesh must be supplied in the form of flat sheets only.
- .4 Epoxy protective coating for non-prestressed reinforcement: in accordance with standard CAN / CSA-G164, latest edition, Hot dip galvanizing of irregularly shaped objects.
- .5 Mechanical connections: subject to the authorization of the Government Representative.

- .6 Round and smooth bars: in accordance with CSA G40.20 / G40.21.

## 2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2 *Reinforcing Steel Manual of Standard Practice* by the Reinforcing Steel Institute of Canada (RSIC).
- .2 Obtain Government Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Upon approval of Government Representative, weld reinforcement in accordance with CSA W186.
- .4 Ship bundles of bar reinforcement clearly identified in accordance with bar bending details and lists.
- .5 Apply tolerances for length and bar bending specified in Figure 6.1, RSIC Reinforcing Steel Manual of Standard Practice.
- .6 Minimum length of reinforcing steel is 6 m where dimensions of formwork allows.
- .7 Unless otherwise indicated in the drawings and specifications, ensure a minimum 600 mm overlap between bars to be joined to each other following work performed in several distinct phases.
- .8 Use the following values for bending reinforcing steel:
  - .1 For reinforcing steel designated 10, 15 or 20 – six (6) times the diameter of the bar;
  - .2 For reinforcing steel designated 25, 30 or 35 – eight (8) times the diameter of the bar.

## 2.3 SOURCE QUALITY CONTROL

- .1 Quality assurance: in accordance with section 01 45 00 - *Quality control*.
- .2 Provide Government Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum four (4) weeks prior to beginning reinforcing work.
- .3 Inform Government Representative of proposed source of supplied material.

## Part 3 Execution

### 3.1 PREPARATION

- .1 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

### 3.2 FIELD BENDING

- .1 Do not field bend or field weld reinforcement except where indicated or authorized by Government Representative.
- .2 When field bending authorized, bend without heat, applying slow and steady pressure.
  - .1 Perform a mechanical and cold folding.

- .3 Replace bars, which develop cracks or splits.

### 3.3 PLACING REINFORCEMENT

- .1 Galvanized reinforcing:
  - .1 Place reinforcing steel as indicated on placing drawings in accordance with CSA A23.1/A23.2 and Government Representative's instructions.
  - .2 Securely attach bars with steel wire ties to prevent movement when concrete is placed:
    - .1 Securely attach reinforcing steel at intersections if these are 300 mm or more apart or at every second intersection if the distance is less than 300 mm.
    - .2 During repair work, formwork frames are attached to form ties.
    - .3 Use annealed steel wire with a minimum diameter of 1.6 mm (16 gauge) to tie reinforcing steel.
    - .4 Bend wires to obtain the same wrap as that required for reinforcing steel.
    - .5 Place existing bars back in their original position if their ties were altered during demolition work. Attach reinforcing steel to each formwork tie in accordance with the required wrapping value; ensure a minimum distance of 25 mm between reinforcing steel and the concrete to be retained.
  - .3 Use plastic spacers spaced at a maximum centre to centre distance of 1200 mm to keep reinforcing steel at the required distance from the formwork, the ground or the existing concrete:
    - .1 Use circular plastic spacers attached at the centre to the reinforcing steel to keep reinforcement layers, consisting of 15 m and 20 m bars, in position.
    - .2 Use plastic spacers to keep in a vertical position reinforcement layers consisting of 25 m bars or larger.
    - .3 Use continuous spacers with plastic-covered wires and plastic shims to keep in a horizontal position the reinforcement layer that is nearest the formwork, the ground or the existing concrete.
    - .4 Unless otherwise indicated in the drawings and specifications, use individual plastic spacers for the other horizontal reinforcement layers.
  - .4 During repair work, at the request of the Government Representative, add reinforcing steel if the reinforcing steel to be retained is corroded to the point where structural integrity has been diminished.
    - .1 Install this additional reinforcing steel with a minimum overlap of 600 mm.
    - .2 Demolish, if necessary, sound concrete in order to comply with this requirement.
- .2 Galvanized reinforcing mesh:
  - .1 The mesh must be free of dirt, earth, paint, rust, splash of hardened concrete from a previous placement of shotcrete, oil and must not be deformed or twisted.

- .2 The mesh must be securely fixed, using fasteners mechanically anchored in the concrete or securely attached to the existing reinforcement, to avoid any displacement during the placing of the concrete.
  - .3 The steel wire used to tie the mesh must be of annealed steel and have a diameter of at least 1.6 mm (16 gauge). The steel wire used with the galvanized mesh must be galvanized. The steel wires must be folded back so as to have the same coating as that required for the trellises they fix.
  - .4 Existing rebar whose fasteners have been damaged by the demolition work must be returned to their original position and fastened by tying of steel wires at each trellis anchorage.
  - .5 The mesh must be placed at least 25 mm from the surface to be covered and have a minimum coating of 30 mm. The mesh must overlap a minimum distance of 150 mm
- .3 Ask the Representative of the Government to accept the reinforcement, the trellis and their installation before pouring the concrete.
  - .4 Ensure to preserve the integrity of the reinforcement coating during concrete pouring.
  - .5 During transport and handling, cover the parts of the bars coated with galvanization to protect them adequately.

### 3.4 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

### 3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 03 10 00 – *Concrete Forming*.
- .2 Section 03 20 00 – *Concrete Reinforcing*.
- .3 Section 03 30 03 – *Concrete Repairs*.

**1.2 ABBREVIATIONS AND ACRONYMS**

- .1 Portland Cement: hydraulic cement, blended hydraulic cement (suffix b denotes blended):
  - .1 GU, GUb and GUL - General use cement.
  - .2 MS and MSb - Moderate sulphate-resistant cement.
  - .3 MH, MHb and MHL - Moderate heat of hydration cement.
  - .4 HE, HEb and HEL - High early-strength cement.
  - .5 LH, LHb and LHL - Low heat of hydration cement.
  - .6 HS and HSb - High sulphate-resistant cement.
- .2 Fly ash types:
  - .1 F - with CaO content maximum 8%.
  - .2 CI - with CaO content 15 to 20%.
  - .3 CH - with CaO minimum 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

**1.3 REFERENCE STANDARDS**

- .1 Use the latest version of the references below
- .2 ASTM International
  - .1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.
  - .2 ASTM C309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
  - .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
  - .4 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
  - .5 ASTM D412-06a, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
  - .6 ASTM D624-00, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
  - .7 ASTM D1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

- .8 ASTM D1752-04a, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .3 CSA Group (CSA):
  - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
  - .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
  - .3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .4 Norms (Québec):
  - .1 Tome VII (2017) Matériaux; Direction des normes et des documents d'ingénierie du Ministère des Transports, de la Mobilité durable et de l'Électrification des Transports (MTMDET)
- .5 Ministère des Transports du Québec (MTQ):
  - .1 Liste des matériaux relatifs au béton éprouvés par le Laboratoire des chaussées, dernière édition.
  - .2 Cahier des charges et devis généraux, Infrastructures routières, Construction et réparation, dernière édition, Gouvernement du Québec.
  - .3 Normes Ouvrages routiers, Tome VII, Matériaux, Gouvernement du Québec, dernière édition.

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: in accordance with Sections 01 31 19 – *Project Meetings* and 01 21 16.19 - *Construction Progress Schedule – Critical Path Method (CPM)*, convene pre-installation meeting one week prior to beginning concrete works.
  - .1 Ensure Government Representative and testing laboratories attend.
    - .1 Verify project requirements.
    - .2 Examine the concrete work procedure.

#### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Site Quality Control Submittals:
  - .1 Provide testing results reports for review by Government Representative and do not proceed without written approval when deviations from mix design or parameters found.
- .3 Concreting procedures:
  - .1 Submit to the Government Representative, for approval and review, concreting procedures. These procedures should illustrate the proposed work methods and proposed methods for quality control (quality management plan).

- .4 Product Data:
  - .1 Submit, to Government Representative, the required technical data sheets and / or descriptive data sheets as well as the manufacturer's documentation concerning the type of concrete, equipment for concreting and any other product or equipment required for concrete work. Data sheets must include product characteristics, performance criteria, physical size, finish and limitations.
- .5 Concrete pours:
  - .1 Provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
- .6 Notice of concreting:
  - .1 Submit a written notice to the Government Representative at least twenty-four (24) hours prior to the beginning of concrete work.
- .7 Concrete hauling time:
  - .1 Provide for review by Government Representative deviations exceeding maximum allowable time of 120 minutes for concrete delivered to site of Work and discharged after batching.

## 1.6 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - *Quality Control*.
- .2 Provide Government Representative, **minimum two (2) weeks prior to starting concrete work**, with valid and recognized certificate from plant delivering concrete.
  - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture meet specified requirements.
- .3 **Minimum two (2) weeks** prior to starting concrete work, provide proposed quality control procedures for review by Government Representative on following items:
  - .1 Falsework erection.
  - .2 Hot weather concrete.
  - .3 Cold weather concrete.
  - .4 Curing.
  - .5 Finishes.
  - .6 Formwork removal.
  - .7 Joints.
  - .8 Unfavorable weather conditions.
- .4 Quality Control Plan: provide written report to Government Representative verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

## 1.7 DELIVERY, STORAGE AND HANDLING

- .1 Transport, store and handle materials and equipment in accordance with Section 01 61 00 – *Common Product Requirements* and written instructions from the manufacturer.
- .2 Delivery and Acceptance Requirements:
  - .1 Concrete hauling time: deliver to site of Work and discharged within one hundred and twenty (120) minutes maximum after batching.
    - .1 Modifying maximum time limit without receipt of prior written agreement from Government Representative and concrete producer as described in CSA A23.1/A23.2. is prohibited.
    - .2 Deviations submitted for review by Government Representative.
  - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .3 Packaging Waste Management:
  - .1 Remove for reuse and return of pallets, crates, and other packaging materials, in accordance with Section 01 74 19 - *Waste Management and Disposal*.

## 1.8 SITE CONDITIONS

- .1 Placing concrete in compliance with limit temperatures in accordance with CSA A23.1/A23.2.
  - .1 The Contractor must take the necessary measures to protect concrete surfaces during adverse weather conditions or sites (precipitation, excessive wind or dust).
  - .2 Protective installations (shelters) must be approved by Government Representative prior to concreting.
- .2 Comply with cold weather concreting requirements when the ambient temperature is below 5 ° C, or when it is likely that the ambient temperature will drop below 5 ° C within 24 hours of placing the concrete.
- .3 Comply with hot weather concreting requirements when ambient temperature is 27 ° C or higher, or where it is likely to exceed 27 ° C during concreting.

## Part 2 Products

### 2.1 DESIGN CRITERIA

- .1 Performance: to CAN/CSA A23.1/A23.2], and as described in MIXES of PART 2 - PRODUCTS.

### 2.2 PERFORMANCE CRITERIA

- .1 Quality Control Plan:
  - .1 Ensure concrete supplier meets performance criteria of concrete as established by Government Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.



## 2.3 MATERIALS

- .1 Portland Cement: type GU to CAN/CSA A3001.
- .2 Blended hydraulic cement: Type GUb to CAN/CSA A3001.
- .3 Supplementary cementing materials: to CAN/CSA A3001 and:
  - .1 Minimum replacement of 15 % fly ash by mass of total cementitious materials to CSA A3001;
  - .2 Minimum of 5% silica fume;
  - .3 Maximum replacement of 30% depending by mass of total cementitious materials.
- .4 Water: to CAN/CSA A23.1.
- .5 Aggregates: to CAN/CSA A23.1/A23.2.
- .6 Admixtures:
  - .1 Air entraining admixture: to ASTM C260.
  - .2 Chemical admixture: to ASTM C494. Government Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Shrinkage compensating grout: premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents to CAN/CSA A23.1/A23.2.
  - .1 Compressive strength: 35 MPa at 28 days.
  - .2 Net shrinkage at [28] days: maximum 0,008 %.
- .8 Non premixed dry pack grout: composition of non metallic aggregate cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 35 MPa at 28 days.
- .9 Curing compound: to CAN/CSA A23.1/A23.2.
- .10 Premoulded joint fillers:
  - .1 Bituminous impregnated fibre board: to ASTM D1751.
- .11 Weep hole tubes: plastic.
- .12 Polyethylene film: 0,15 mm thick to CAN/CGSB-51.34.
- .13 Dampproof membrane: to 3701 du Tome VII – Matériaux.
- .14 Reinforcing steel laid in accordance with Section 03 20 00 – *Concrete Reinforcing*

## 2.4 MIXES

- .1 Performance Method for specifying concrete: to meet Government Representative performance criteria to CSA A23.1/A23.2.
  - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
  - .2 Provide concrete mix to meet following plastic state requirements:
    - .1 Workability: free of superficial stains.
  - .3 Provide concrete mix to meet following hard state requirements:

- .1 Durability and class of exposure: C-1.
- .2 Compressive strength at 28 days: 35 MPa minimum.
- .3 Intended application: repairs and barriers.
- .4 Aggregate size: 20 mm maximum.
- .5 Pre-Qualification: air entraining, sagging and temperature results from past use of the proposed mixture.
- .4 Submit a quality management plan to ensure quality control of concrete according to specified performance requirements.
- .5 Concrete Supplier Certification: The mixing plant and materials must meet the requirements of CAN/CSA A23.1.

### **Part 3 Execution**

#### **3.1 QUALITY CONTROL ON SITE**

- .1 Require, from the concrete supplier, a delivery slip for each concrete load and provide a copy of this slip to the Government Representative, after each concreting. The following information must appear on the slip:
  - .1 Supplier's name and address;
  - .2 Truck number;
  - .3 Name of the Contractor;
  - .4 Designation and location of the project;
  - .5 Class of concrete;
  - .6 Cumulative quantity;
  - .7 Start of unloading;
  - .8 End of unloading;
  - .9 Maximum aggregate size;
  - .10 Required air required;
  - .11 Types of adjuvants used;
  - .12 Quantity and type of cement;
  - .13 Quantity of water.
- .2 On site, Field, Laboratory and/or Factory Tests:
  - .1 Perform the following tests in accordance with Section 01 45 00 – *Quality Control* and submit a report in accordance with PART 1 - ACTION AND INFORMATIONAL SUBMITTALS:
    - .1 Concrete pours;
    - .2 Sagging;
    - .3 Air content;
    - .4 Compressive strength at 7 and 28 days;
    - .5 Ambient temperature and concrete temperature;
    - .6 Register of tests

- .2 The inspection and testing of concrete and its components will be carried out by the test laboratory designated by the Contractor, to the satisfaction of the Government Representative, according to CAN/CSA A23.1 / A23.2.
  - .1 Ensure that the test laboratory is certified to CAN/CSA A283.
- .3 The test laboratory will take additional test pieces during cold weather concreting work. The cure of these specimens must be done on site, under the same conditions as the concrete pours from which they are extracted.
- .4 Destructive and non-destructive testing of concrete shall be performed in accordance with the methods described in CAN/CSA-A23.1 / A23.2. These tests must be carried out by the laboratory designated by Contractor.

### 3.2 PREPARATION

- .1 Obtain Government Representative written approval before placing concrete.
  - .1 Provide twenty-four (24) hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 – *Concrete Reinforcing*.
- .3 During concreting operations:
  - .1 Development of cold joints not allowed.
  - .2 Ensure concrete delivery and handling facilitate placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete permitted only after approval of equipment and mix
- .5 Disturbing reinforcement and inserts during concrete placement are prohibited.
- .6 Prior to placing of concrete obtain Government Representative approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .7 Protect previous Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate **records of poured concrete** items to indicate date, location of pour, quality, workability, air content, temperature, test samples taken and the results of all the tests (% air, sag, compressive strength, etc.).
- .10 In locations where new concrete dowelled to existing work, drill holes in existing concrete.
  - .1 Place well cleaned steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout to anchor and hold dowels in positions as indicated.
- .11 Do not place load upon new concrete until authorized by Government Representative.
- .12 Immediately before placing concrete, thoroughly water substrates with clean water.

### 3.3 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CAN/CSA A23.1/A23.2.
- .2 Sleeves and inserts:

- .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by Government Representative.
  - .2 Where approved by Government Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
  - .3 Sleeves and openings greater than 100 x 100 mm not indicated reviewed by Government Representative.
  - .4 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain written approval of modifications from Government Representative before placing of concrete.
  - .5 The Contractor must anticipate during the installation of the reinforcement the possibility of conflict of positioning of the reinforcement with that of cast-in-place elements such as bollards, rungs and all other elements cast in the concrete.
  - .6 Confirm locations and sizes of sleeves and openings shown on drawings.
  - .7 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts:
- .1 Set anchor bolts to templates in coordination with appropriate trade prior to placing concrete.
  - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Government Representative.
    - .1 Preformed holes must have a diameter of at least one hundred (100) mm.
    - .2 The diameter of holes drilled after setting concrete must be in accordance with the manufacturer's recommendations.
  - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
  - .4 Set bolts and fill holes with epoxy grout.
  - .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Drainage holes and weep holes:
- .1 Form weep holes and drainage holes in accordance with Section 03 10 00 - *Concrete Forming*. If wood forms used, remove them after concrete has set.
  - .2 Install weep hole tubes and drains as indicated.
- .5 Finishing and curing:
- .1 Finish concrete to CAN/CSA A23.1/A23.2.
  - .2 Use procedures as reviewed by Government Representative to remove excess bleed water. Ensure surface not damaged.
  - .3 Finishing:
    - .1 Repairs of abutments above retaining walls: rough trowel finish (such as the existing one);
    - .2 Exposed vertical wall (Canal side): architectural finish required (must be smooth);

- .3 Approach slabs: rough finish;
  - .4 Elsewhere: smooth finish;
  - .5 Sidewalks: brushed finish (if required).
- .6 Joint fillers:
- .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Government Representative.
  - .2 When more than one piece required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
  - .3 Locate and form expansion joints as indicated.
  - .4 Install joint filler.
- .7 Control cracking:
- .1 The kerf required on the plans must be done as soon as it is possible to do so without removing the aggregates or causing any wrinkling, when the concrete has begun to harden, but before the tensile forces produced by the shrinkage caused irregular cracks.
  - .2 The kerf must be straight. It must not deviate by more than six (6) mm over a length of three (3) m. Immediately after sawing, the groove and the surface of the concrete liner must be cleaned of sawdust or debris.
  - .3 Provide for the preparation, supply and treatment of cracks for the purpose of injecting an additional thirty (30) meters of length for any type of cracks in concrete. This length of intervention does not include the repair of cracks higher than the value indicated in the article tolerance under the responsibility of the Contractor.

### 3.4 SURFACE TOLERANCE

- .1 Ensure surfaces are smooth, continuous and uniform. Make sure that the exposed face of the wall (Canal side) is free of cavities.
- .2 Formwork joints must not be visible (surface must be smooth).
- .3 Cracks with a width greater than 0.8 mm must be repaired and injected according to activity 3106 – Obturation de fissures par injection du Manuel d'Entretien des Structures, Gouvernement du Québec, latest edition.

### 3.5 CURING OF CONCRETE CAST-IN-PLACE CONCRETE ELEMENTS

- .1 Curing of concrete put in place must be made in accordance with the following requirements in addition to the curing requirements of CAN/CSA-A23.1 / A23.2.
- .2 Curing unformed concrete surfaces: absorbent cloths soaked in water:
  - .1 Place water-saturated synthetic fiber cloths on concrete surfaces hard enough to prevent surface damage, then cover with waterproof sheets to maintain moisture on the surface of concrete surface;
  - .2 Overlap each strip a minimum of seventy-five (75) mm and secure against movement by the wind;

- .3 Maintain absorbent webs in place and keep them wet so that there is a thin layer of water on the surface of concrete for the duration of the cure, at least for seven (7) calendar days after concreting.
- .3 Curing formed concrete surfaces:
  - .1 No additional cure is required if formwork is left in place for seven (7) consecutive days or more;
  - .2 If formwork is removed in less than seven (7) consecutive days, in accordance with Section 03 10 00 - Concrete Forming And Accessories, absorbent cloths impregnated with water or a curing material forming a membrane shall be applied immediately on loose surfaces and maintained in place for the remainder of the seven (7) calendar day period.
  - .3 During the curing period, only uncover the areas needed for finishing treatment then recover and continue the cure.

### 3.6 COLD WEATHER PROTECTION

- .1 Some concrete work in Tome VII (MTQ), chapitre 3 – *Bétons et produits connexes*, can be done in cold weather and may require shelter, heating or thermal insulation.
- .2 The temperature of the plastic concrete at the time of installation must comply with the requirements of the standard 3101 du Ministère des Transports du Québec, present at the Annexe 1, (Tome VII (MTQ), chapitre 3, section 3.1 *Béton*, norme 3101 *Bétons de masse volumique normale*.
- .3 Provide shelter heating to comply with the instructions in this section and the requirements of CSA Standard A23.1 / A23.2, Concrete Materials and Methods of Concrete Construction / Test methods and Standard Practices for Concrete, relating to the temperatures of the materials adjacent to the repairs during concreting, the constituents of the concrete and the temperature during the curing of the concrete.
- .4 Maintain a minimum temperature of 10 °C on concrete surfaces for a minimum of seven (7) consecutive days following concreting.
  - .1 Extend the protection period until the concrete has reached 70% of the required compressive strength at twenty-eight (28) days.
- .5 After the protection period, gradually lower the concrete temperature during the first twenty-four (24) hours.
  - .1 The rate of decrease in temperature must not be greater than 10 °C / hour.
  - .2 Do not put concrete in contact with outside air if the temperature difference of the concrete and the outside air is greater than 20 °C.
- .6 Concrete cure requirements apply regardless of the type of protection installed.
- .7 Any concrete that has frozen is not paid and is rejected. The part of the structure built with this concrete is considered to be defective and must be rebuilt according to the plans and specifications at the expense of the Contractor.
- .8 Existing concrete, reinforcement and formwork
  - .1 The use of sodium chloride or calcium as a de-icing agent is prohibited.

- .2 .2 In the case of free-air concreting, pre-heat to a minimum temperature of 5 °C all surfaces (existing concrete, reinforcement, formwork, etc.) with which the plastic concrete comes into contact, up to concreting.
- .9 In the case of concreting under shelter, heat and maintain the contact surfaces at a temperature between 5 °C and 20 °C for a period of at least twenty-four (24) hours prior to concreting.
- .10 Keep the formwork in place for the duration of the protection and maintain the form surfaces at a temperature between 5 °C and 20 °C for the duration of the protection.
- .11 Types of protection
  - .1 Insulation
    - .1 Use insulating material to cover plastic concrete surface.
      - .1 Each layer of insulating material shall be a waterproof cover type made from closed cell foam board and have a thermal resistance RSI of 0.40.
      - .2 The day before concreting, the number of layers of insulating material to be laid have to be approved by the Government Representative.
        - .1 Depending on the evolution of the concrete temperature during the protection period, the Government Representative may require reducing or increasing the number of layers.
        - .2 The removal or addition of a layer must be made within three (3) hours of the request of the Government Representative.
      - .3 Ensure that the insulation is laid in such a way that it prevents any exposure of the concrete surfaces to outside air for the duration of the protection.
      - .4 The joints of insulating covers shall have an overlap of at least seventy-five (75) mm.
      - .5 The insulation is paid at the Submitting Slip for the item corresponding to the insulation (RSI 0,40 per layer).
    - .2 Temporary shelters
      - .1 Protective shelters should enclose structures
      - .2 At least two (2) weeks before the start of the concrete work under protective shelters, prepare and submit the Plan of realization of these shelters.
      - .3 Shelter should cover the surfaces of the concrete work with cloths and tarpaulins.
        - .1 These covers must be waterproof, resistant and fixed so as not to be displaced during the period of protection.
      - .4 Ensure shelter height and size permit placement of concrete (shot or cast), concrete finishing and curing.
      - .5 The shelter is paid on the Submitting Slip for the item corresponding to the temporary shelter.

### 3.7 CLEANING

- .1 Clean in accordance with Section 01 74 00 – *Cleaning*.
  - .1 Leave the Work area clean at the end of each working day.
- .2 Final Cleaning: dispose of surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 – *Cleaning*.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Prepare a construction waste reduction plan in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .2 After receiving written authorization from the Government Representative, route unused concrete and concrete components to a local recycling facility.
  - .3 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.
  - .4 Provide appropriate area on job site where concrete trucks and be safely washed.
  - .5 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Government Representative.
  - .6 Disposal of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location to pose health or environmental hazard is prohibited.
  - .7 Prevent admixtures and additive materials from entering drinking water supplies or streams.
  - .8 Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal.
  - .9 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

**END OF SECTION**



**Part 1 General**

**1.1 DESCRIPTION**

- .1 This section prescribes the requirements for the local demolition and repair of existing concrete works.
- .2 Demolition and repair work include:
  - .1 Removal of deteriorated concrete;
  - .2 Preparation of surfaces;
  - .3 The cleaning of the frames;
  - .4 The addition and replacement of rebar;
  - .5 Supply, installation and removal of formwork;
  - .6 The installation of anchors;
  - .7 Humidification of surfaces;
  - .8 The application of the binding agent (adhesive);
  - .9 Installation and supply of repair concrete;
  - .10 Finishing and treatment of ripening.

**1.2 RELATED REQUIREMENTS**

- .1 Section 02 41 16 – *Structure Demolition*.
- .2 Section 03 10 00 – *Concrete Forming*.
- .3 Section 03 20 00 – *Concrete Reinforcing*.
- .4 Section 05 12 33 – *Structural Steel for Bridges*.
- .5 Section 09 91 13.23 – *Exterior Painting of Structural Steel*.

**1.3 PRICES AND PAYMENT TERMS**

- .1 Refer to section 01 29 00 - *Payment*

**1.4 SCOPE OF WORK**

- .1 In general, this section defines the following repairs:
  - .1 Garon Bridge (7)
    - .1 Repair work on abutments, including concrete injection and repair of foundation elements.
    - .2 Partial demolition and reconstruction of backwall at North and South abutments.
    - .3 Partial demolition and reconstruction of deck slab portions at the ends of the deck.
    - .4 Partial demolition and rebuilding of wheel hunt and curbs at North and South abutments.

- .5 5 Partial demolition and repair of deck slab.
- .6 .6 Partial demolition and repair on the counterweight.
- .7 .7 Demolition and repair of sidewalks.
- .2 Lafleur Bridges (7a)
  - .1 Partial demolition and reconstruction of backwall at South abutment.
  - .2 Partial demolition and reconstruction of deck slab portions at ends of deck at South abutment.
  - .3 Partial demolition and reconstruction of wheel guards and curbs at South abutment.
  - .4 Partial demolition and repair of the retaining wall between the Gauron and Lafleur bridges on the south side.
  - .5 Partial demolition and repair of deck slab.
  - .6 Hydrodemolition and deck slab overlap by adding a concrete tread.

## 1.5 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI)
  - .1 ACI 304.2, Latest edition, *Placing Concrete by Pumping Methods*.
  - .2 ACI 546.1, Latest edition, *Guide to Repair of Concrete Bridge Superstructures*
- .2 ASTM International
  - .1 ASTM E488/E488M, Latest edition, *Standard Test Methods for Strength of Anchors in Concrete Elements*.
  - .2 ASTM C295/C295M, Latest edition, *Standard Guide for Petrographic Examination of Aggregates for Concrete*.
- .3 CSA Group (CSA):
  - .1 CAN / CSA-A23.1 / A23.2, Latest Edition, Concrete Materials and Workmanship / Test Methods and Standard Practices for Concrete.
  - .2 CAN / CSA-269.1, Latest Edition, Scaffolding for Construction Purposes.
  - .3 CAN / CSA-S269.3, Latest edition, Formwork.
  - .4 CAN / CSA-G30.18, Latest edition, Billet Steel Bars for Concrete Reinforcement.
  - .5 CAN / CSA G30.3, Latest edition, Cold Drawn Steel Wire for Concrete Reinforcement.
  - .6 CAN / CSA-G30.5, Latest Edition, Welded Wire Mesh for Concrete Reinforcement.
  - .7 CAN / CSA A3000, Latest edition, Compendium of Cementitious Materials (contains A3001, A3002, A3003, A3004 and A3005).
- .4 Ministère des Transports du Québec (MTQ):
  - .1 *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation*, last edition.
  - .2 *Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3101, Béton de masse volumique normale*, last edition.

**1.6 SUBMITTALS / SUBMITTALS FOR APPROVAL / INFORMATION**

- .1 Submit required documents and samples in accordance with Section 01 33 00 - *Submittal Procedures* to the Government Representative at least ten (10) days prior to commencement of work.

**1.7 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00 - *Quality Control*.

**Part 2 Products**

**2.1 PRODUCTS AND DEMOLITION EQUIPMENT AUTHORIZED FOR REINFORCED CONCRETE WORKS**

- .1 **Cement:** according to the CAN / CSA A3000 standard, GU type.
- .2 **Water:** according to CSA A23.1.
- .3 **Aggregates:** in accordance with CSA A23.1 / A23.2.
- .4 **Binder (adhesive)**
  - .1 Bonding agent (adhesive) on existing concrete surfaces before concreting: slip made of latex, cement and water mixed in the following proportions:
    - .1 3 kg of GU type cement
    - .2 7.5 liters of latex
    - .3 Approximately 2.5 liters of water until creamy.
- .5 **Chemical anchors:**
  - .1 Use two-component injectable adhesive for installation of all reinforcing steel studs in existing concrete.
  - .2 Minimum compressive strength: 50 MPa.
  - .3 Included in Dowel Adhesives list of Designated Sources of Materials.
- .6 **Demolition equipment authorized for reinforced concrete structures:**
  - .1 Replacement of deck joints
    - .1 Partial demolition of the backwall
      - .1 Hammer type: manual pneumatic hammer
      - .2 Maximum mass: 30 kg
    - .2 Demolition of the slab portion concrete at the ends of the deck:
      - .1 Hammer type: manual pneumatic hammer
      - .2 Maximum mass: 30 kg
    - .3 Partial demolition of wheel guards and curbs
      - .1 Hammer type: manual pneumatic hammer
      - .2 Maximum mass: 30 kg
  - .2 Partial Demolition of Counterweight Concrete:
    - .1 Hammer type: manual pneumatic hammer

- .2 Maximum mass: 7 kg
- .3 Partial demolition of deck slab surface and sidewalks
  - .1 Hammer type: manual pneumatic hammer
  - .2 Maximum mass: 15 kg
- .4 Partial Demolition of Retaining Wall Surface Between Gauron and Lafleur Bridges, South Side
  - .1 Hammer type: manual pneumatic hammer
  - .2 Maximum mass: 15 kg
- .5 Have the Government Representative approve the selection of any equipment used for concrete demolition. The Government Representative reserves the right to change the type and strength of the demolition equipment

### **Part 3 Execution**

#### **3.1 GENERAL**

- .1 Before the start of work, the Government Representative will determine and delimit, in the presence of the Contractor, the concrete areas to be demolished.
- .2 Provide the Government Representative with the necessary security equipment to enable him to determine the areas to be demolished and to verify the affected areas.
- .3 Remove and replace any damaged or defective concrete with concrete meeting the prescriptions and requirements of plans and specifications and as directed by the Government Representative.

#### **3.2 REPLACING DECK JOINTS**

- .1 Partial Demolition and Reconstruction of deck slab portions at the ends of the deck.
  - .1 Ten (10) days prior to commencement of demolition work on reinforced concrete slab portions, submit to the Government Representative the Work Plan for this type of work. The Work Plan should specify, but not be limited to:
    - .1 Description and sketches, if required temporary access systems signed and sealed by a member engineer in good standing of the Ordre des ingénieurs du Québec;
    - .2 The technical sheets of the equipment proposed for the execution of the demolition and reconstruction works;
    - .3 Product data sheets proposed for demolition and reconstruction work;
    - .4 Proposed working methods for the demolition and reconstruction of the slab.
  - .2 Demolish deck slab as indicated on drawings for this type of work.
  - .3 Regardless of the repair performed, the original appearance of the structure and texture should be maintained unless otherwise indicated by the Government Representative.
  - .4 Before the start of work, the Government Representative determines and delimits, in the presence of the Contractor, the concrete areas to be repaired.

- .5 Provide the Government Representative with the necessary security equipment to determine areas to be demolished and to verify repaired surfaces.
- .2 Partial demolition and reconstruction of the backwall
  - .1 Ten (10) days prior to the commencement of the partial demolition of the backwall, submit to the Government Representative the Work Plan for this type of work. The Work Plan should specify, but not be limited to:
    - .1 Description and sketches, if required temporary access systems signed and sealed by a member engineer in good standing of the Ordre des ingénieurs du Québec;
    - .2 The technical sheets of the equipment proposed for the execution of the demolition and reconstruction works;
    - .3 Product Data Sheets proposed for demolition and reconstruction work;
    - .4 Proposed working methods for the demolition and reconstruction of the backwall.
  - .2 Partially demolish backwall as indicated on drawings for this type of work.
  - .3 Regardless of the repair performed, the original appearance of the structure and texture should be maintained unless otherwise indicated by the Government Representative.
  - .4 Before the start of work, the Government Representative determines and delimits, in the presence of the Contractor, the concrete areas to be repaired.
  - .5 Remove and protect the steel structure covering the trunnion chamber and provide for the dismantling and reinstallation of the steel crows anchored to the concrete to be demolished, if applicable.
  - .6 Provide the Government Representative with the necessary security equipment to determine surfaces to be demolished and to verify repaired surfaces.
- .3 Partial Demolition and Reconstruction of wheel guards and curbs
  - .1 Ten (10) days before the partial demolition of the wheel hunt and curb, submit to the Government Representative the Work Plan for this type of work. The Work Plan should specify, but not be limited to:
    - .1 Description and sketches, if required, of temporary access systems signed and sealed by a member engineer in good standing of the Ordre des ingénieurs du Québec;
    - .2 The technical sheets of the equipment proposed for the execution of the demolition and reconstruction works;
    - .3 Product Data Sheets proposed for demolition and reconstruction work;
    - .4 Proposed methods of work for the demolition and reconstruction of wheel guards and curbs.
  - .2 Partially demolish wheel guards and curbs as indicated on drawings for this type of work.
  - .3 Regardless of the repair performed, the original appearance of the structure and texture should be maintained unless otherwise indicated by the Government Representative.

- .4 Before the start of work, the Government Representative determines and delimits, in the presence of the Contractor, the concrete areas to be repaired.
- .5 Provide the Government Representative with the necessary security equipment to determine areas to be demolished and to verify repaired surfaces.

### **3.3 DEMOLITION OF CONCRETE**

- .1 Take the necessary precautions to avoid damaging the parts to be preserved during concrete demolition work. For this purpose, use the pneumatic demolition hammers permitted in paragraph 2.1.6, Authorized Demolition Equipment for Reinforced Concrete Structures, of this Specification Section.
- .2 Prior to the start of work, provide the Government Representative with the technical data sheet of the equipment used as well as the proposed protective measures.
- .3 Before starting the removal work, make a saw cut of a maximum depth of about 20 mm to delimit the work area and this for all categories of demolition. Take all necessary precautions so that the kerf, on the perimeter of the demolition, does not reach the frames.
- .4 If the reinforcement to be preserved is damaged by the demolition work and can no longer be reused, replace the reinforcement at the expense of the Contractor.
- .5 After demolition, ensure a rough surface for better adhesion to the new concrete.
- .6 Final cleaning of demolished surfaces with a jet of water pressure equivalent to 500 kPa at 450 mm from the nozzle.
- .7 The Government Representative will review the condition of the remaining concrete to ensure that the demolition has been completed in accordance with good practice.

### **3.4 PREPARATION OF SURFACES**

- .1 Clear surfaces shall be clean and free of loose and friable particles.
- .2 The cleared surfaces must be approved by the Government Representative before the start of concrete work.
- .3 Keep surfaces wet for at least eight (8) hours prior to concreting and remove all water accumulation. Surfaces must be superficially dry before concreting.

### **3.5 APPLICATION OF ADHESIVE**

- .1 At the locations required by the Government Representative, apply the priming layer to ensure the connection between the new concrete and the concrete in place. If the binder is dry when concreting, clean the surface again with a water jet and apply a new layer of adhesive.

### **3.6 PREPARATION OF CONCRETE**

- .1 .1 Provide type XIV-R self-consolidating concrete (35 MPa), type VS concrete (35 MPa) and type XVI-15 concrete in accordance with the collection - Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3101, *Béton de masse volumique normale*, last edition.

- .2 Deliver this ready-mixed type concrete, manufactured in a concrete plant, transported and unloaded on site in accordance with section 18 of CAN / CSA-A23.1 or equivalent concrete manufactured on a mobile concrete mixer.
- .3 Require the concrete supplier a delivery slip for each concrete load and provide a copy of this form to the Government Representative. The following information will appear on the slip:
  - .1 Supplier's name and address
  - .2 Truck number
  - .3 Contractor's name
  - .4 Designation and location of the project
  - .5 Concrete class
  - .6 Cumulative Quantity
  - .7 Start of unloading
  - .8 End of unloading
  - .9 Maximum aggregate size
  - .10 Required Air Required
  - .11 Types of adjuvants used
  - .12 Quantity and type of cement
  - .13 Quantity of water.
- .4 Saturate concrete surfaces immediately before concreting on surfaces.
- .5 Follow directions in Section 20 of CAN / CSA-A23.1 for Construction Joints. Provide key construction joints throughout their length with a depth equal to one sixth of this thickness, with a maximum of 100 mm. Bevel the sides of the keys slightly.
- .6 Protect and cure concrete in accordance with Section 21 of CAN / C-SA-A23.1. In cold weather, protect concrete in accordance with article 15.4.3.8 of the Cahier des charges de devis généraux – Infrastructures routière – Construction et réparation (CCDG). The costs provided for in the Cahier des charges de devis généraux – Infrastructures routière – Construction et réparation (CCDG) do not apply to this specification. In case of conflict, the most severe standard applies.
- .7 The use of curing product is prohibited

### **3.7 FINISHING**

- .1 Unless otherwise specified, finish unformed concrete surfaces in accordance with Clause 22 of CAN / CSA A23.1.

### **3.8 FINISHING FORMED SURFACES**

- .1 Finish formed surfaces in accordance with Section 24 of CAN / CSA-A23.1.
- .2 Fill holes left by formwork tie rods with non-shrink mortar. Fill only the hole, without staining the surrounding surface.

### **3.9 REPAIR OF NEW CONCRETE**

- .1 Remove and replace any damaged or defective concrete with concrete that meets the requirements and requirements of plans and specifications and as directed by the Government Representative.
- .2 After removal of forms, voids, honeycombs and other defects will be examined by the Government Representative. Submit to the Government Representative for approval repair methods for voids, honeycombs or other defects where applicable. Do not proceed with any surface correction until authorized by the Government Representative.

### **3.10 DEMOLITION AND PARTIAL REPAIR OF CONCRETE ON THE COUNTERWEIGHT - GAURON BRIDGE (7)**

- .1 Generalities:
  - .1 Ten (10) days before the start of partial counterweight concrete demolition work, submit to the Government Representative the Work Plan for this type of work. The Work Plan should specify, but not be limited to:
    - .1 Description and sketches, if required, of temporary access systems signed and sealed by a member engineer in good standing of the Ordre des ingénieurs du Québec;
    - .2 Data sheets of the equipment proposed for the execution of the demolition and repair work;
    - .3 Product data sheets proposed for demolition and repair work;
    - .4 Proposed working methods for the demolition and repair of counterweight concrete.
  - .2 Prior to the start of work, the Government Representative determines and delimits, in the presence of the Contractor, the concrete areas to be demolished.
  - .3 Provide the Government Representative with the necessary security equipment to determine the areas to be repaired and to verify the rebuilt surfaces.
- .2 Temporary access:
  - .1 Provide, maintain and dismantle temporary access systems required to perform demolition work on the counterweight of the Gauron Bridge.
- .3 Protection measure:
  - .1 Implement protective measures required to protect users and their vehicles during demolition, cleaning, concreting and surface plastering operations.
- .4 Surface Coating:
  - .1 The Contractor must use the products listed in the most recent edition of the list of concrete materials tested by the MTQ pavement laboratory.
  - .2 Provide and apply a concrete waterproofing in accordance with Article 15.4.1.4, 15.4.2.4 and 15.4.3.6.1 of the Specifications and general specifications - Road infrastructure - Construction and repair on all concrete surfaces of the counterweight. The shade of the waterproofing product should match the existing shade of the concrete.



- .3 Treated surfaces must be protected from rain and splashing for a period of 6 hours following the application of the waterproofing.
- .4 Between 7 days and 24 hours before the application of the waterproofing agent, the surfaces to be waterproofed must be previously treated with a jet of wet abrasive or a high pressure water jet in order to obtain a surface free of any plaster, curing material, laitance, oil, paint, rust or other dirt. Within the same period, the treated surfaces must then be cleaned using a pressurized water jet (pressure 15MPa, flow rate 20l / min, concentrated circular jet nozzle and distance nozzle-concrete surface of 150mm to 200mm) so as to obtain a surface free of any debris.
- .5 The equipment used for the wet abrasive jet must be equipped with a filter which captures the oil; the effectiveness of the filter must be demonstrated before using the equipment. The waterproofing agent can only be applied if the ambient temperature and that of the surfaces to be waterproofed are above 5 ° C and there is no risk of freezing within 12 hours of installation.
- .6 The counterweight surfaces are painted. The Contractor must consider that the paint may contain lead.

### 3.11 HYDRODEMOLITION

- .1 Calibration:
  - .1 Perform, in the presence of the Government Representative, a calibration test of the hydrodemolition equipment.
  - .2 Notify the Government Representative in writing at least twenty-four (24) hours prior to calibration testing.
  - .3 During the test, adjust the equipment to remove all delaminated concrete and a thickness of approximately 10 mm in sound concrete areas.
  - .4 Proceed with various variations (pressure, speed, angle of attack, etc.) to the satisfaction of the Government Representative.
  - .5 Use the parameters selected for the execution of the work.
- .2 Demolish by hydrodemolition the surfaces to be covered with a concrete screed.
- .3 Take the necessary precautions to avoid damaging the parts to be preserved during concrete demolition work.
- .4 Suspend the work and notify the Government Representative if the hydrodemolition is no longer in accordance with the previously completed calibration test.
- .5 Inspect demolished surfaces and, when the residual concrete thickness after hydrodemolition is less than 80 mm, following the approval of the Government Representative, continue the demolition on the total depth of the affected surfaces of the slab. using a pneumatic hammer and perform a deep repair as shown in the drawings.
- .6 Provide water management for hydrodemolition including its recovery and disposal in compliance with environmental requirements.
- .7 Evaluate the surface profile, after hydrodemolition, from the standard platelets available from ICRI. The concrete surfaces on which the new concrete is to be installed shall have a

minimum surface profile, after demolition, corresponding to the CSP 7 configuration referred to in Guideline No 0310.2R "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair "published by the International Concrete Repair Institute (ICRI).

- .8 Cleaning the surfaces:
  - .1 Following hydrodemolition demolition, clean all surfaces to be covered with a concrete screed using a jet of pressurized water to obtain a debris-free surface.
    - .1 Pressure: 15 MPa
    - .2 Flow rate: 20 L / min
    - .3 Nozzle: concentrated circular jet
    - .4 Distance between nozzle and concrete surface: 150 mm to 200 mm.
  - .2 Perform this cleaning in less than twenty-four (24) hours prior to pouring the concrete screed.
  - .3 No bitumen, asphalt or membrane residues must be present on the concrete surface to be in contact with the screed.

### 3.12 CONSTRUCTION OF A CONCRETE SCREED

- .1 Construct a concrete screed with a thickness of at least 55 mm at any point and a maximum thickness of 180 mm with type XVI-15 concrete meeting the requirements of the collection - Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3101, *Béton de masse volumique normale*, last edition.
- .2 Conduct a suitability test, off site, prior to completion of the screed. Unless otherwise specified, the requirements of C.C.D.G. concerning the convenience test apply with the exception that the quantity produced must be approximately 3 m<sup>3</sup>.
- .3 Coarse aggregates of calcareous or dolomitic nature are prohibited. Use the ASTM C295 Standard Guide for Petrographic Examination of Aggregates for Concrete to macroscopically determine the petrographic nature of aggregates.
- .4 Immediately prior to placing screed concrete, apply adhesion grout to contact surfaces. Brush the grout with a stiff bristle broom. The adhesive grout should not be applied more than 5 minutes before the latex concrete is put in place and must not have dried.
- .5 For grout, use the same cement and latex mix as those used for concrete preparation.
- .6 Finishing the concrete screed
- .7 Make transverse and longitudinal profiles of concrete using vibrating rule finishing equipment:
  - .1 Brand: Allen
  - .2 Model: Razorback 12HD or SA12.
- .8 Set up finishing equipment on rails as soon as Government Representative has validated the accuracy of rail profile.
- .9 Execute an empty run on the lines indicated on the drawing validated by the Government Representative.
- .10 Concreting from the lowest point of the concrete zone when the slope is greater than 2%

- .11 Traffic at the rear of the finishing equipment is prohibited.
- .12 Begin concrete curing no more than 5 minutes after placing the concrete.
- .13 Perform transverse grooving by means of an irregularly spaced crosswise comb. The width of the teeth of the comb is  $3 \text{ mm} \pm 0.5 \text{ mm}$  and the depth of the impression in the concrete must be between 2 and 6 mm, without dislodging the granulate. The accepted sequences are as follows:
  - .1 16/25/22/16/32/19/25/25/25/25/19/22/25/32/25/25/25/32/38/22/25/22/25 mm;
  - .2 32/19/22/25/35/22/22/22/22/25/35/38 mm.
- .14 Fill the transverse and longitudinal joints with a low viscosity epoxy approved in the list of cement concrete materials tested by the Direction générale du laboratoire des chaussées du Ministère des transports du Québec.
- .15 Provide a tread surface with a minimum adhesion of 0.9 MPa at 28 days measured as per section 7.8 of CSA A23.1.
- .16 Prohibit any traffic on the screed during the cure period. The concrete must have reached its specified strength 28 days before opening to traffic.

### 3.13 SURFACE AND DEEP REPAIR OF SLAB AND SIDEWALK

- .1 Following the removal of the bituminous mix and the cleaning of the surface, the Government Representative must carry out a survey by hammer and / or chain to identify the delaminated areas to be repaired. The statement is then analyzed by the designer.
- .2 Mark surface to be repaired with a 20 mm deep kerf.
- .3 The surfaces to be repaired must have a square or rectangular shape and extend at least 150 mm around the damaged surface. Those within 600 mm of each other must be integrated into a single surface.
- .4 Saw cuts must not cross at corners of surfaces to be repaired; the demolition of the concrete near the meeting point of the sawdust is finalized with the aid of a 7 kg manual pneumatic hammer.
- .5 If necessary, reduce the depth of the kerf to avoid damaging the rebar.
- .6 Demolish concrete to a minimum depth of 60 mm until concrete is sound.
- .7 Clear at least 25 mm reinforcements made visible by demolition.
- .8 When the demolition required to reach the sound concrete or to clear the reinforcement ensures that the demolition is more than 100 mm, demolish the concrete over the full thickness of the slab, as shown in the drawings.
- .9 Take precautions to prevent debris falling from the demolition into the watercourse.
- .10 Install forms to obtain a surface in the same plane as surrounding surfaces and to avoid concrete leakage around the perimeter of the repair. When the concrete surface to be repaired is small, the forms can be fixed under the slab with anchors, otherwise they must be fixed to the beams. Formwork must not be attached to supports supported on the top of the slab.
- .11 A 7 kg pneumatic hammer or hydrodemolition equipment is required.

- .12 Clean reinforcement and concrete surface with a high-pressure water jet or wet blast spray to remove rust and loose particles and aggregates from the concrete.
- .13 Clean the concrete surface with a pressurized water jet (pressure 15 MPa, flow rate 20 l / min, nozzle with concentrated circular jet and distance nozzle-concrete surface 150 to 200 mm).
- .14 Support or fix existing reinforcement as required.
- .15 If necessary, add reinforcements of the same diameter as those existing to compensate for steel bars whose cross section is reduced by more than 30%, either by corrosion or by demolition work. In general, the loss of section on rebar can be compensated globally, it would be possible to add one (1) additional bar for three (3) damaged bars.
- .16 Clean formwork from debris using an air jet or pressurized water jet or vacuum cleaner.
- .17 Moisten contact surfaces before placing new concrete. However, the free water at the surface and at the bottom of the formwork must be removed before concreting.
- .18 Carry out XIV-R or Type XIV-S self-compacting repair concrete in accordance with the collection - Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3101, *Béton de masse volumique normale*, last edition or equivalent approved by the Government Representative (35mpa).

### 3.14 REPAIR OF ABUTMENT FOUNDATIONS

- .1 Mark area to be repaired with existing concrete by 20 mm deep saw. No kerf is to be executed on the masonry.
- .2 The saw cuts must not cross at the corners of the surfaces to be repaired; the demolition of the concrete near the meeting point of the sawdust is finalized with the aid of a 7 kg manual pneumatic hammer.
- .3 If necessary, reduce the depth of the kerf to avoid damaging the rebar.
- .4 Demolish concrete to a minimum depth of 60 mm until concrete is sound.
- .5 Clear at least 25 mm reinforcements made visible by demolition, if applicable.
- .6 Clean reinforcement and concrete or masonry surface with a high-pressure water jet or wet blast spray to remove rust and loose particles and aggregate from the concrete.
- .7 Take precautions to prevent debris falling from the demolition into the watercourse.
- .8 Install formwork to prevent concrete leakage around the perimeter of the repair.
- .9 A 7 kg pneumatic hammer or hydrodemolition equipment is required.
- .10 Clean the concrete surface with a pressurized water jet (15 MPa pressure, 20 l / min flow, concentrated jet nozzle and nozzle distance-concrete surface 150 to 200 mm).
- .11 Clean formwork of any debris with an air jet or pressurized water jet or vacuum cleaner.
- .12 Moisten contact surfaces before placing new concrete. However, the free water at the surface and at the bottom of the formwork must be removed before concreting.
- .13 Carry out XIV-R or Type XIV-S self-compacting repair concrete in accordance with the collection - Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3101, *Béton de*

*masse volumique normale*, last edition or equivalent approved by the Government Representative (35MPa). Predict the pressure required to fill all the cavities.

### 3.15 CRACK INJECTIONS

- .1 The work aims to close the cracks by injecting them under pressure with an epoxy-based product. Each crack to be treated has, at any point along its length, an opening of at least 0.8 mm. Cracks have a length of less than one meter and they can be visible either on the two (2) opposite faces of an element (crack which crosses the element), or on only one face of the element. The Government Representative indicates on the site the cracks to be closed.
- .2 The contractor must provide the Government Representative, at least fourteen (14) days before starting work, a Work Plan describing in detail the products, equipment and proposed injection method as well as the name of the responsible for the work on the site. The technical sheets of the products and equipment, the model and the serial number of the manometer, of maximum pressure of 300 psi, as well as its certificate of calibration dating from less than twelve (12) months, and the list of five (5) similar projects that the project manager has supervised must also be included in the work plan. The latter must be signed by an engineer, member of the Ordre des ingénieurs du Québec; This engineer must have at least five (5) years of experience in the field of epoxy injection in structural works. The Work Plan must include the full description of five (5) similar projects carried out by this engineer during the last five (5) years.
- .3 The injection into the cracks must be made in accordance with the work plan presented to the Government Representative with the details of these specifications.
- .4 The injectors must be of the “surface” type. The sealant must be an epoxy-modified mortar; it must have sufficient capacity to withstand the pressure generated during the injection. The viscosity of the injection product, after adding the hardener, should be less than 250 cps at around 22 ° C. The date of manufacture of the injection product must be indicated on the containers and must be later than March 1 of the year of use. It is prohibited to add solvent, thinner or any other material to the injection product. All products are delivered to the job site in their original containers and sealed.
- .5 The following injection products are accepted by the Government:
  - Epoxy-Scel-80, available from Krytex inc .;
  - Epoxy-Scel-300, available from Krytex inc .;
  - Eucopoly Injection Resin, available from Euclid inc .;
  - Seal Rez EP 0127, available from Ambex inc .;
  - Sikadur 52, available from Sika Canada inc.
- .6 The contractor remains responsible for the choice of injection product to use and its performance once injected.
- .7 The injection equipment must be in good condition and be composed of piston pumps, electric or pneumatic, having a maximum pressure of approximately 200 psi. Following the path of the epoxy in the injection line, a calibrated pressure gauge must be installed, followed by the mixing chamber, followed in turn by the injection nozzle. The dimensions

- of the equipment must be such that it can be located on the scaffolding and in the immediate vicinity of the cracks to be injected.
- .8 The contractor must give a written notice of at least twenty-four (24) hours to the Government Representative to specify the date and time of the start of work. A similar written notice must also be given for any suspension of work of more than twenty-four (24) hours.
  - .9 Injection into cracks can only be done if the temperature of the concrete, measured in the shade, is above 15 ° C without exceeding 30 ° C. Work is suspended between October 1 and April 30. The temperature of the components of the injection product must be between 20 ° C and 30 ° C during the injection. Injection into cracks exposed to weathering or traffic spray can be done as long as the injection equipment and products are not themselves exposed.
  - .10 Surfaces adjacent to cracks must be cleaned with a steel brush so that they are free of dirt, oil, efflorescence and other foreign matter. Cleaning the interior of the cracks with water or any other product is not necessary. The injectors are then fixed to the concrete in line with the cracks on the opposite vertical faces of the element, without drilling the concrete. The injectors are spaced a distance which corresponds to approximately the thickness of the element where the injection is to be made and are installed in places where the crack is clean and has the largest possible opening, even if it means varying a little the spacing between two (2) injectors. The first and the last injector are placed at a distance from the end of the crack which corresponds to half of the usual spacing. At least two (2) injectors must be installed per vertical face of an element. The sealing product must be placed around the injectors, on the adjacent surfaces of the cracks and, if required, on the other faces of the element; the product is laid over a uniform width of at least 50 mm and beyond the visible limits of the cracks.
  - .11 Just before injecting into each crack and after plugging all the injectors, the contractor must test the injectors and the sealant with a 75 psi compressed air jet. Any air leakage results in the replacement of defective materials and a new leak test. The leak test is also used to establish whether the crack crosses the element from one side to the other. The equipment used for the air jet must be fitted with an oil catching filter; its effectiveness must be demonstrated before use.
  - .12 The contractor must demonstrate that he has a good understanding of the injection process by treating a first crack. The Representative of the Government authorizes the contractor to continue working with the other cracks if this first crack is treated to his satisfaction. When injecting into this crack, a sufficient quantity of each of the components of the injection product, drawn at random before the mixing chamber, is poured into graduated containers so as to check their proportion. The maximum deviation allowed from the specifications in the manufacturer's technical data sheet is  $\pm 5\%$ .
  - .13 The engineer who signed the Work Plan must be present on site during the injection into the first crack in the first structure; he must remain on the site as long as the Government Representative or the contractor deems it necessary.
  - .14 The injection can only start when the color of the injection product is uniform. For a vertical or inclined crack, the injection must start from the lowest point of the crack; for a horizontal crack, the injection must start at one end of the crack. The contractor must inject into only one crack at a time and from one of the faces if it has been established that the crack passes



right through the element; in the latter case, the injectors on the opposite side serve as a vent. The injection pressure measured at the nozzle outlet must be less than 50 psi. The injection must continue continuously, the next injector must be closed when the injection product flows there and so on with the other injectors until refusal; maintain the rejection pressure (50 psi) at the first injector for at least ten (10) minutes. This injector is then closed and the injection must continue at the last injector where there was a flow, until the complete filling of the crack. In the case of a crack which crosses the element from side to side, if there is no flow to one of the injectors located on the face opposite to that used for the injection after having maintained the pressure of refusal for at least ten (10) minutes, the contractor must continue the injection in the same way on the opposite side.

- .15 Any injection stop time exceeding 75% of the pot life of the injection product used results in the stopping of work and the cleaning of all equipment and accessories. If microcracks form near the crack during injection, the injection should be stopped immediately.
- .16 If the injection product leaks through the blockage or through a closed injector, the injection must be stopped immediately; the injection can only continue after the leaks have been plugged. For cracks that have not yet been treated, the leakage test is performed with an air pressure of 125 psi.
- .17 The sealant, injectors and any leakage, leakage or splash of injection product must be removed to the level of the original concrete when the injection product has sufficiently hardened, but not before a delay of at least twenty-four (24) hours after the end of the injection.

### **3.16 WINTER CONDITIONS**

- .1 Some concrete work may be done in cold weather and may require shelter, heating or thermal insulation.
- .2 The temperature of the plastic concrete at the time of installation must comply with the requirements of the norme 3101 of the Ministère des Transports du Québec, presented in Appendix 1, Bétons de masse volumique normale.
- .3 Provide shelter heating to comply with the instructions in this section and the requirements of CSA Standard A23.1 / A23.2, Components and Performance of Work / Test Methods and Standard Practices for Concrete, temperature of materials adjacent to repairs during concreting, concrete constituents and temperature during concrete curing.
- .4 Maintain a minimum temperature of 10 ° C for a minimum period of seven (7) consecutive days following concreting.
  - .1 Extend the protection period until the concrete has reached 70% of the required compressive strength at twenty-eight (28) days.
- .5 After the protection period, gradually lower the concrete temperature during the first twenty-four (24) hours.
  - .1 The rate of decrease in temperature must not be greater than 10 ° C / hour.
  - .2 Do not put concrete in contact with outside air if the temperature difference between the concrete and the outside air is greater than 20 ° C.
- .6 Concrete cure requirements apply regardless of the type of protection put in place.

- .7 Any concrete that has frozen is not paid and is rejected. The part of the structure built with this concrete is considered to be defective and must be rebuilt according to the plans and specifications at the expense of the Contractor.
- .8 Existing concrete, reinforcement and formwork
  - .1 The use of sodium chloride or calcium as a de-icing agent is prohibited.
  - .2 In the case of free-air concreting, pre-heat to a minimum temperature of 0 ° C, all surfaces (existing concrete, reinforcement, formwork, etc.) with which the plastic concrete comes into contact.
- .9 In the case of concreting under shelter, heat and maintain at a temperature between 0 ° C and 20 ° C the contact surfaces for a period of at least 24 hours before concreting.
- .10 Keep formwork in place for the duration of the protection and maintain the form surfaces at 0 ° C and 20 ° C for the duration of the protection.
- .11 Types of protection
  - .1 insulation
    - .1 Use insulating material to cover the surface of plastic concrete.
      - .1 Each layer of insulating material shall be of the impervious cover type made from closed cell foam board and have an RSI thermal resistance of 0.40.
    - .2 The day before concreting, have the Government Representative approve the number of layers of insulating material to be laid.
      - .1 Depending on the evolution of the concrete temperature during the protection period, the Government Representative may require reducing or increasing the number of layers; the removal or addition of a layer must be done within three (3) hours of the request of the Government Representative.
    - .3 Ensure that the insulation is laid in such a way that it prevents any exposure of the concrete surfaces to outside air for the duration of the protection.
    - .4 The joints of insulating covers shall have an overlap of at least 75 mm.
    - .5 The insulation is paid at the tender slip for the item corresponding to the insulation (RSI 0,40 per layer).
  - .2 Temporary shelter
    - .1 Construct protective shelters that enclose structures.
    - .2 At least two (2) weeks before the start of the concrete work under protective shelters, prepare and submit the Plan of realization of these shelters.
    - .3 Make the shelter in such a way to cover the surfaces of the concrete work with canvas and tarpaulins.
      - .1 These covers must be watertight, resistant and fixed so as not to be displaced during the period of protection.
    - .4 Ensure shelter is of sufficient height and size to accommodate interior, concrete placement, concrete finish and curing.



- .5 The shelter is paid at the Submitting Slip at the item corresponding to the temporary shelter for concrete work.
- .3 Heating
  - .1 Ensure that heating appliances such as boilers, heaters, etc., are of sufficient capacity and number to maintain concrete at the required temperature. A stream of hot air must circulate inside the shelter. The heat must reach all surfaces, whether they are shuttered or not.
  - .2 Ventilate protective shelter properly during heating period.
  - .3 Place heaters outside the shelter.
  - .4 At least two (2) weeks prior to start of concrete under protective shelter, prepare and submit the proposed Heating System Plan.
  - .5 The heating is paid to the Submitting slip at the item concerning the heating of the protective shelter.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 16 – *Structure Demolition.*
- .2 Section 09 91 13.23 – *Exterior Painting of Structural Steel.*

**1.2 PRICE AND PAYMENT PROCEDURES**

- .1 Include all materials and work specified in this section in the lump sum or unit amount of the various items tendered in the Submitting Slip, part of the tender documents, for steel reinforcements on the Gauron Bridge (Bridge No7). These lump sum or unit amounts must also include the following:
  - .1 Ensure lump sum price includes radiographic examination of optional shop splices and additional field splices.
  - .2 Preparation and painting of factory surfaces.
  - .3 Date stamping of steel parts at the factory.
  - .4 Supply and installation of bolts
  - .5 The painting of bolts on site.
- .2 The payment of the partial demolition charges for the steel structure is included in the price quoted on the payment items of the Submitting Slip for Gauron Bridge Steel Reinforcements (Bridge No7).
- .3 The payment of installation fees for temporary access devices, necessary for the execution of the framing work, are included in the price submitted to the payment items of the Submitting Slip for the supply, installation and dismantling of access and temporary protection works.

**1.3 REFERENCE STANDARDS**

- .1 American Association for State Highway and Transportation Officials (AASHTO)
  - .1 AASHTO HB Standard Specifications for Highway Bridges, latest edition.
- .2 ASTM International (ASTM)
  - .1 ASTM F3125/F3125M-[15a], Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions, latest edition.
- .3 CSA Group (CSA)
  - .1 CSA G40.20 / G40.21, latest edition, General Requirements for Rolled and Welded Structural Quality Steel / Structural Steels.
  - .2 CSA G164, latest edition, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CSA S6, latest edition, Canadian Highway Bridge Design Code.
  - .4 CSA S16, latest edition, Design of Steel Structures (Limit States Design Rules for Steel Structures).
  - .5 CSA S269.1, latest edition, Falsework for Construction Purposes.

- .6 CSA W47.1 Certification of Companies for Fusion Welding of Steel
- .7 CSA W48, latest edition, Filler Metals and Allied Materials for Metal Arc Welding.
- .8 CSA W59, latest edition, Welded Steel Construction, (Metal Arc Welding).
- .4 Ministère des Transports du Québec
  - .1 *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation*
  - .2 *Ouvrages routiers, Normes, Tome VII – Matériaux, norme 6101, Acier de construction.*
  - .3 *Ouvrages routiers, Normes, Tome VII – Matériaux, norme 6201, Boulons, tiges d'ancrage, écrous et rondelles d'acier.*

#### 1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Installation Meetings:
  - .1 Convene pre-installation meeting one (1) week prior to beginning work of this Section, with PCA Project Manager, Contractor's Representative, Government Representative and Design Engineers of the Consultant in accordance with Section 01 31 19 - Project Meetings to:
    - .1 Verify project requirements.
    - .2 Review installation and substrate conditions.
    - .3 Co-ordination with other building subtrades.
    - .4 Review manufacturer's written installation instructions and warranty requirements.
  - .2 Prior to start of Work arrange for site visit with Government Representative to examine existing site conditions adjacent to demolition work.
  - .3 Site Meetings: On-site inspections by the manufacturer shall include site visits.
  - .4 Hold meetings as per Section 01 31 19 - *Project Meetings*.
  - .5 Ensure presence of key personnel, PCA Project Manager and Government Representative.
  - .6 Government Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

#### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Product Data:
  - .1 Submit data sheets, manufacturer's instructions and documentation for structural steel. The data sheets must indicate the characteristics of the products, the performance criteria, the dimensions, the limits and the finish.
  - .2 Submit two (2) copies of MSDS under WHMIS, in accordance with Section 01 35 29.06 - *Health and Safety Requirements* and Section 01 35 43 - *Environmental Procedures*.

.3 Shop Drawings:

- .1 All submitted shop drawings must be submitted to the Government Representative at the start-up meeting of the project and must bear the seal and signature of a competent engineer who is a member in good standing of the Ordre des Ingénieurs du Québec.
- .2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
- .3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.
- .4 Submit description of methods, temporary bracing and strengthening, sequence of erection and type of equipment proposed for use in erecting structural steel. The description provided must bear the seal and signature of a competent engineer who is a member of the Ordre des Ingénieurs du Québec.
- .5 The drawings of the temporary shoring works submitted must bear the seal and signature of a competent engineer member in good standing of the Ordre des Ingénieurs du Québec.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle in accordance with Section 01 61 00 - *Common Product Requirements*.
- .2 Delivery and Acceptance: Deliver materials and materials to the work site in their original packaging, which must be labeled with the name and address of the manufacturer.
  - .1 Provide government Representative with delivery schedules minimum seven (7) days prior to shipping.
- .3 Storage and Handling:
  - .1 Provide protective blocking for lifting, transportation and storing.
    - .1 Do not notch edges of members.
    - .2 Do not cause excessive stresses.
  - .2 Mark mass on members weighing more than [3] tonnes.
  - .3 Ensure that no portion of steel comes into contact with ground.
    - .1 Replace defective or damaged materials with new.

**1.7 QUALITY ASSURANCE**

- .1 Preconstruction Testing:
  - .1 Provide suitable facilities and cooperate with Government Representative in carrying out inspection and tests required.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Structural steel: to CSA G40.20/G40.21, grade and types as indicated.



- .1 Leave atmospheric corrosive resistant steel and connections material in unpainted, include bolts, nuts, washers and weld deposits of compatible weathering characteristics.
- .2 High strength bolts, nuts and washers: to ASTM F3125/F125M, grade A325M. Bolts in accordance with ASTM F3125 / F3125M, grade A490M may be used, subject to the approval of the Government Representative.
- .3 Anchor bolts, washers and nuts: to CSA G40.20/G40.21, grade 300W galvanized.
- .4 Welding electrodes: to CSA W48 series.
- .5 Hot dip galvanizing: to CAN / CSA-G164, and galvanizing at least 600 g / m<sup>2</sup>.

## 2.2 SOURCE QUALITY CONTROL

- .1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.
- .2 Provide suitable facilities and co-operate with Government Representative in carrying out inspection and tests required.

## Part 3 Execution

### 3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.
  - .1 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Government Representative.
  - .3 Determine the geometry and bolting pattern of existing assemblies prior to the production of shop drawings for the fabrication of steel components. Inform the Government Representative of any major contradictions between the drawings and the existing conditions and generating unacceptable conditions.

### 3.2 PREPARATION

- .1 Clean steel surfaces of dirt and unwanted deposits to the satisfaction of the Government Representative. According to standard **SSPC-SP6 or SSPC-SP15 and preferably SSPC-SP15 in places difficult or impossible to sandblast.**
- .2 Work near riverbanks or embankments in accordance with written instructions from Government Representative.
- .3 Prior to the shaping of the elements, check on the existing structure all levels, dimensions, dimensions and details of the elements of the structure to replace or modify. The dimensions and dimensions shown in the plans are taken from the original construction plans and subsequent modifications of the structure; the actual dimensions and dimensions may therefore vary from one element to another and from one place to another on the frame.

- .4 Any significant discrepancies in actual levels, dimensions or dimensions and those indicated in the plans must be reported immediately to the Government Representative.
- .5 If required, in order to obtain an adequate fit between the parts, some parts may be finalized on site. However, the details of the parts covered by this work and the operations envisaged must first be submitted to the Government Representative for approval.
- .6 Before proceeding with structural reinforcement work, the Contractor shall submit to the Government Representative for review and approval details of the methods and sequence of assembly of the elements as well as the characteristics and weight of the equipment he intends to use on the structure.
- .7 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
  - .1 Enlarge holes if necessary by reaming only after receipt of written approval from Government Representative.
  - .2 Ensure reamed holes are 2 mm maximum larger than bolt size used.

### 3.3 INSTALLATION

- .1 Construct temporary shoring systems in accordance with CSA S269.1.
- .2 Do fabrication and erection of structural steel in accordance with CSA S6, Design of Highway Bridges and *Cahier des charges et devis généraux, Infrastructures routières Construction et réparation..*
- .3 Do welding in accordance with CSA W59, except where specified otherwise.
  - .1 Do welding in shop unless otherwise permitted by Government Representative.
  - .2 Weld only at locations indicated.
- .4 High strength bolting: in accordance with CAN/CSA S6. Use turn-of-nut tightening method.
- .5 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.
- .6 Allowable tolerance for bolt or rivet holes:
  - .1 Matching holes for rivets and bolts to line up so that dowel 2 mm less in diameter than hole passes freely through assembled members at right angles to such members. Drilling of all holes must be done with drills and not with a blowtorch.
  - .2 Finish holes not more than 2 mm in diameter larger than diameter of rivet or bolt unless otherwise specified by Government Representative.
  - .3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.
  - .4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:

Centre-to-Centre distance in metres	Tolerance in plus or minus mm
less than 10	1
10 to 20	2
20 to 30	3

- .5 Correct mispunched or misdrilled members only as directed by Government Representative.
- .7 Bolting:
  - .1 In addition to the requirements of CSA-S6, meet the following requirements:
    - .1 Bolt tightening bolts using one of the following methods:
      - .1 Manual tightening using a jaw wrench;
      - .2 Clamping with an adjustable percussion wrench to achieve the required tension in the bolt or having a maximum capacity not exceeding this tension.
    - .2 Provide a bolting procedure describing the method used at the job site for bolting. Include the following information in the bolting procedure:
      - .1 Description of the equipment used at each step of the tightening;
      - .2 The method of adjustment of sections of steel elements;
      - .3 The sequence of placing and tightening the bolts;
      - .4 The calibration certificate for the bolt tension tester: This certificate shall contain the following information:
        - .1 Model of the device;
        - .2 Serial number;
        - .3 Date of certificate must be less than twelve (12) months old.
    - .5 Hold a meeting prior to the bolting of the steel elements to be reinforced or replaced on the relevant works comprising the PCA Project Manager, the Government Representative, the representative of the Contractor, the engineer who signed the bolting procedure as well as the foreman who assembles the steel components, at least seven (7) days before the start of assembly work.
    - .6 The meeting will take place once the bolting procedure is deemed complete by the Government Representative.
    - .7 The agenda of the meeting includes the following activities:
      - .1 Review of bolting procedure;
      - .2 Contractual requirements for placing bolts;
      - .3 Receiving inspection of bolts on assembled bolt production batch.
    - .8 **For all assemblies:** the verification and the follow-up of the works must be carried out without possible delegation, by a member engineer in good standing of the Ordre des Ingénieurs du Québec (IOQ); the bolting inspection notice must be signed by that engineer.
    - .9 Tightening bolts of an assembly is considered to be compliant when all bolts can be loosened by means of a jaw wrench. If the tightening of one of the bolts tested does not comply, all the bolts of the assembly are checked and those by new bolts.

- .10 In the event of non-compliance, the engineer who signed the procedure shall, if necessary, improve the method of snug tightening and transmit to the Government Representative, if necessary, a new bolting procedure before continuing the work. in place bolts.
- .11 The final tightening of the bolts of an assembly is deemed to be in conformity when the relative rotation of each bolt and its nut is within the permissible tolerances established during the inspection of the bolts. Bolts that do not meet these requirements must be replaced in accordance with a written procedure signed by the engineer who signed the bolting procedure.
- .12 When checking for bolts of a certain length, comply with the following requirements:
  - .1 Use sufficiently rigid spacer to avoid deformation during tightening in the bolt tension tester;
  - .2 The number of spacers must be reduced to a minimum;
  - .3 Spacers must be as thick as possible;
  - .4 The spacers must be in perfect contact with each other;
  - .5 The spacers shall be selected to allow the end of the bolt to protrude from the nut by approximately 3 mm.
- .8 Mark structural steel components in accordance with CSA G40.20 / G40.21.
  - .1 It is forbidden to mark them with the punch.
  - .2 Marking of unpainted steel structural elements such that marks are not visible after assembly.
- .9 Fitting Marks: mark joints in the shop for assembly.
- .10 Prior to removal of structural elements, install all shoring, support and reinforcement devices and structures.
  - .1 Have the installations checked by the engineers who have signed the descriptive documents for these temporary installations and obtain a written and signed certification of their conformity.
- .11 Before proceeding with the removal of structural elements, provide a copy of the certification of the conformity of temporary shoring, support and reinforcement devices and structures to the Government Representative. All temporary assemblies of the structure must be considered and made as anti-slip assemblies, as prescribed by the standard
- .12 The Contractor must ensure that at no time the integrity, stability or capacity of the structure is compromised by the execution of the work.
- .13 Where existing holes on existing parts are used to attach new elements, check the exact position and diameter of the holes and report to the Government Representative any significant deviation from the plan indications.
- .14 Dating of new steel parts:
  - .1 Date all new steel parts permanently integrated into existing Gauron Bridge structure (Bridge No7).



- .2 Fifteen (15) days prior to commencement of work, submit a sample of the steel date stamp to the Departmental Representative for approval.
  - .1 Date pieces by punching indicating the year of execution of the work only. (Example: 2020)
  - .2 Perform punching of the date in the factory, before painting the steel parts.
  - .3 Use low stress punching tools (punches with rounded tip) to apply marks.
  - .4 Stamp the year of execution of the work of the steel pieces to a maximum depth of 2 mm. The numbers must have a height of 20 mm.
  - .5 Stamp the year of execution of the work on a visible face of the steel piece, after its integration with the existing structure, to the satisfaction of the Government Representative.

### **3.4 REINFORCEMENT OF THE LOWER GUSSETS OF THE GAURON BRIDGE**

- .1 Do the work only when the bridge is closed to traffic and there is no load on the deck.
- .2 Perform the replacement of steel elements in accordance with the requirements of article 15.7.7 Modification ou réparation d'ouvrages existants du Cahier des charges et devis généraux Infrastructures routières – Construction et réparation. If rust is between the existing steel elements, this must be removed.
- .3 Comply with the requirements of article 10.18.4 Detail of CAN / CSA S6 bolted connections when making shop drawings of the elements to be replaced.
- .4 Special requirements for measurement before manufacture:
  - .1 Record the dimensions of the elements to be replaced on site (length, width, thickness of the base and the core), and validate that the original element corresponds to the description of the elements shown on the plans. If this is not the case, the Government Representative will validate the type of item to be used for replacement.
  - .2 Identify dimensions (height, width, thickness) and positioning of riveted or bolted joining plates to items to be replaced or repaired, as well as hole positions and diameter.
  - .3 Record the diameter and positioning of the holes in the elements to be replaced.
  - .4 Also identify on site the number and characteristics of assembly bolts required to replace existing bolts (length, diameter and type of finish).
  - .5 Identify any other relevant details necessary for the fabrication of new elements.
- .5 Using site information, prepare shop drawings for items to be replaced, and submit for approval to the Government Representative.
  - .1 Observe the minimum distance between the edge of the reinforcement plate and the center of a bolt hole indicated in Table 10.11 of article 10.18.4.8 Minimum distance to the shores of CAN / CSA S6.
  - .2 Comply with minimum 125 mm spacing between new bolts added as shown in drawings.
- .6 Detail the item:
  - .1 With required assembly plates;

- .2 With holes required for assembly;
- .3 With number and diameter required for all holes and features of each type of bolts required to make new joints.
- .7 Carry out piercing at the site using the element remaining on site as a template.
- .8 Deliver the elements to the bare metal: they will be painted on site when the entire existing bridge will be repainted at the site.
- .9 Fabricate replacement and repair items after approval of shop drawings by the Government Representative.
- .10 For the placement of some gussets or reinforcing plates, it might be required to first remove temporarily adjacent connexion or lacing plates on connecting members.
  - .1 Identification of existing elements to be temporarily removed, as well as the intervention sequence, shall be part of the work method description to be submitted by the Contractor to the Government Representative for approval.
  - .2 The Contractor shall insure that removed elements are not damaged. In case of damage to these elements, The Contractor shall supply new identical pieces, at his own cost.
  - .3 Once the joint reinforcement completed, the removed elements shall be reinstalled using new bolts of adequate size and length, as per the requirements of article 3.5 hereafter.
- .11 Immediately before placing the element, clean the contact surfaces of the assembly plates and the load-bearing elements according to the criteria required for anti-slip joints, according to one of the two methods described in the first paragraph of this section. Article 15.7.6.1 Joints boulonnés du Cahier des charges et devis généraux Infrastructures routières – Construction et réparation. Mechanical cleaning (SSPC-SP15) is done with a needle hammer. SSPC-SP6 cleaning is done by spraying a dry abrasive without crystalline silica. It is permissible for rust to remain at the bottom of the bites following site cleaning as per the SSPC-SP15 specification. The cleaning must be approved by the Government Representative immediately before assembling.
- .12 When item is delivered to site, start replacing bolts and rivets the item to be replaced by temporary bolts:
  - .1 A maximum of three bolts or three rivets must be replaced at a time for each of the elements to be reinforced. Initiate the replacement of the following bolt / rivet group only after making sure that the temporary bolts are properly secured.
  - .2 Cut existing rivets using hydraulic or pneumatic shears. Existing assembly bolts can be unfastened or cut using hydraulic or pneumatic shears.
  - .3 Clean at site with abrasive disc (polifan disc) around holes of existing elements that are retained so that the head of the future bolt and / or its washer and / or nut evenly bear on the steel surface.
  - .4 As the removal of the bolts progresses, pick up removed nuts and washers for regular disposal to the metal recycling containers.
- .13 Once all bolts and rivets are replaced, install steel reinforcement and begin replacing temporary bolts with new bolts:

- .1 Install the element manually or with a suitable lifting gear, which allows a gradual and controlled installation. The lifting method must be approved in advance by the Government Representative.
- .2 Gradually remove temporary bolts for installation of new bolts. A maximum of three temporary bolts must be replaced at a time for each of the elements to be reinforced. Start replacing the next bolt / rivet group only after blocking the new bolts.
- .3 Put bolts in holes and tighten them according to the requirements of article 15.7.6.1.1 *Mise en place des boulons du Cahier des charges et devis généraux Infrastructures routières – Construction et réparation*, and according to the article 10.24.6.6 Method of tightening by rotation of the nut of standard CAN / CSA S6.
- .4 As the removal of the bolts progresses, pick up removed nuts and washers for regular disposal to the metal recycling containers.
- .14 Before beginning the use of the bolts, provide the required attestation of conformity of the supplier and described in article 15.7.4.3.1 *Attestation de conformité du Cahier des charges et devis généraux Infrastructures routières – Construction et réparation*.
- .15 Deliver to the site bolts, nuts and washers as specified in the 3rd paragraph of article 15.7.6.1 *Joints boulonnés du Cahier des charges et devis généraux Infrastructures routières – Construction et réparation*.
- .16 When receiving the bolts on site, submit the lots to the acceptance inspection as described in article 15.7.4.3.2 *Contrôle de réception du Cahier des charges et devis généraux Infrastructures routières – Construction et réparation*.
- .17 The maximum time between placing a bolt in a hole and final tightening is ten (10) calendar days.
- .18 Section 10.24.6.7 *Inspection of CAN / CSA S6* describes the method used to inspect bolt tightening.
- .19 If it is not possible to put a bolt in a hole, enlarging holes on site is permitted only if the Government Representative allows it and if the tolerances of the present estimate are respected after reaming.
- .20 Remove temporary supports when they are no longer required.

### 3.5 REPLACEMENT OF RIVETS OR BOLTS

- .1 Identify and validate original bolt size to be replaced on site and replace existing bolt with another bolt of same size.
- .2 Replacement of rivets or bolts shall be done by group of three maximum, or individually if the connection has less than 8 bolts
- .3 Temporarily support the beam containing the assembly bolt (s) to be replaced.
- .4 Remove existing bolts that are deficient buy unfastening them or using pneumatic or hydraulic shears.
- .5 Clean with abrasive disc (polifan disk) around holes so that bolt head and nut are evenly distributed. Ream holes as required with permission of Government Representative.

- .6 Install new bolts and tighten securely. Make the final tightening by the method of rotation of the nut.

### 3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste management: sort out wastes for their recycling, as per section 01 74 19 – Waste Management and Disposal.
  - .1 Remove containers and recycling bins from work site and dispose at appropriate facilities.

**END OF SECTION**

**APPENDIX 1**

**Construction steel**



## NORME

PIÈCES MÉTALLIQUES

### 6.1 Aciers de construction

## Aciers de construction

Tome <b>VII</b>	
Chapitre <b>6</b>	Norme <b>6101</b>
Page <b>1</b> de <b>2</b>	
Date <b>2015 12 15</b>	

### 1. Objet

La présente norme a pour objet de déterminer les exigences du Ministère en ce qui a trait aux caractéristiques et aux critères d'évaluation des aciers de construction.

### 2. Références

La présente norme renvoie à l'édition la plus récente des documents suivants :

#### NORMES

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM A500/A500M « Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes ».

ASTM A572/A572M « Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel ».

ASTM A992/A992M « Standard Specification for Structural Steel Shapes ».

ASSOCIATION CANADIENNE DE NORMALISATION

CSA G40.20/G40.21 « Exigences générales relatives à l'acier de construction laminé ou soudé/Acier de construction ».

CAN/CSA S6 « Code canadien sur le calcul des ponts routiers ».

### 3. Caractéristiques requises

Les aciers de construction doivent être conformes aux exigences de la norme CSA G40.21 « Acier de construction ». De plus, les exigences thermiques et énergétiques pour l'essai de résilience Charpy doivent être conformes aux tableaux 10.12 et 10.13 de la norme CAN/CSA S6 « Code canadien sur le calcul des ponts routiers ».

L'acier des pieux tubulaires et des pieux caissons doit être conforme aux exigences stipulées dans la norme CSA G40.21 « Acier de construction », nuance 350W. Les tolérances dimensionnelles de fabrication des pieux doivent être conformes aux valeurs indiquées dans les tableaux 11, 12, 15 et 17 de la norme CSA G40.20 « Exigences générales relatives à l'acier de construction laminé ou soudé ».

L'acier des pieux profilés en H doit être conforme aux exigences stipulées au tableau 7 « Propriétés mécaniques des profilés et des palplanches » de la norme CSA G40.21 « Acier de construction » ou conforme au grade 50 ou 55 de la norme ASTM A572/A572M « Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel ».

L'acier des profilés creux de type HSS pour drains et joints de tablier doit être de nuance 350W, conforme aux exigences de la norme CSA G40.21 « Acier de construction », ou être de grade C, comme stipulé à la norme ASTM A500/A500M « Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes ».

L'acier ASTM A992/A992M « Standard Specification for Structural Steel Shapes » ainsi que l'acier de grade 50 de la norme ASTM A572/A572M « Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel » peuvent être acceptés comme équivalents de l'acier de nuance 350W de la norme CSA G40.20/G40.21 « Exigences générales relatives à l'acier de construction laminé ou soudé/Acier de construction ».

### 3.1 Marquage

Les aciers de construction doivent être marqués conformément aux exigences de la norme CSA G40.21 « Acier de construction ».

Tome <b>VII</b>	
Chapitre <b>6</b>	Norme <b>6101</b>
Page <b>2 de 2</b>	
Date <b>2015 12 15</b>	

PIÈCES MÉTALLIQUES	
<b>6.1 Aciers de construction</b>	
<b>Aciers de construction</b>	



**NORME**

Dans le cas de produits comprenant plusieurs numéros de coulée, ces derniers doivent être fournis avec leur emplacement dans la pièce.

Dans le cas des pieux tubulaires et des pieux caissons, chaque tube doit être marqué conformément aux exigences de la norme CSA G40.21 « Acier de construction ».

Dans le cas des pieux profilés en H, chaque profilé doit être marqué conformément aux exigences de la norme CSA G40.21 « Acier de construction » ou de la norme ASTM A572/A572M « Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel ».

Contenu normatif

**APPENDIX 2**

**Steel Bolts, anchorages, washers and nuts**





## NORME

PIÈCES MÉTALLIQUES

### 6.2 Boulons, tiges d'ancrage, écrous et rondelles en acier

### Boulons, tiges d'ancrage, écrous et rondelles en acier

Tome

VII

Chapitre	Norme
6	6201

Page
1 de 3

Date
2018 12 15

## 1. Objet

La présente norme a pour objet de déterminer les exigences du Ministère en ce qui a trait aux caractéristiques et aux critères d'évaluation des boulons, tiges d'ancrage, écrous et rondelles en acier.

## 2. Références

La présente norme renvoie à l'édition la plus récente des documents suivants :

### NORMES

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM A123/A123M « Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products ».

ASTM A153/A153M « Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware ».

ASTM A193/A193M « Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications ».

ASTM A194/A194M « Standard Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts for Bolts for High Pressure or High Temperature Service, or Both ».

ASTM A307 « Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength ».

ASTM A449 « Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use ».

ASTM A563 « Standard Specification for Carbon and Alloy Steel Nuts ».

ASTM F436/F436M « Standard Specification for Hardened Steel Washers Inch and Metric Dimensions ».

ASTM F593 « Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs ».

ASTM F594 « Standard Specification for Stainless Steel Nuts ».

ASTM F3125/F3125M « Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions ».

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASME B18.21.1 « Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series) ».

ASSOCIATION CANADIENNE DE NORMALISATION

CSA G40.20/G40.21 « Exigences générales relatives à l'acier de construction laminé ou soudé/Acier de construction ».

## 3. Caractéristiques requises

Les boulons, les tiges d'ancrage, les écrous et les rondelles doivent être conformes aux exigences des normes suivantes.

### 3.1 Boulons

ASTM A307

– Grade A : boulons destinés à l'usage général.

ASTM F3125/F3125M

– Grade A325

- type 1 : boulons en acier à moyenne teneur de carbone;

- type 3 : boulons en acier à résistance améliorée à la corrosion;

- les filets doivent être roulés.

Contenu normatif

Tome <b>VII</b>	
Chapitre <b>6</b>	Norme <b>6201</b>
Page <b>2</b> de <b>3</b>	
Date <b>2018 12 15</b>	

PIÈCES MÉTALLIQUES	
<b>6.2 Boulons, tiges d'ancrage, écrous et rondelles en acier</b>	
<b>Boulons, tiges d'ancrage, écrous et rondelles en acier</b>	



- Grade A490
  - type 1 : boulons en acier allié;
  - type 3 : boulons en acier à résistance améliorée à la corrosion;
  - les filets doivent être roulés.
- Grade F1852
  - type 1 : boulons en acier à moyenne teneur en carbone;
  - type 3 : boulons en acier à résistance améliorée à la corrosion.

#### ASTM A449

- boulons en acier à moyenne teneur en carbone. Les boulons à tête ronde, galvanisés à chaud, sont utilisés pour retenir les éléments de glissement en tubes d'acier.

#### ASTM F593

- boulons en acier inoxydable, estampillés F 593C, D, G, H, L ou M.

### 3.2 Tiges d'ancrage

Les parties filetées et non filetées des tiges d'ancrage doivent présenter le même diamètre que celui spécifié sur les plans. Dans le cas des structures de signalisation et d'éclairage, les filets des ancrages doivent être roulés, et une transition de 30° au maximum doit être réalisée entre la partie non filetée et la partie devant être roulée. Pour éviter des problèmes de fragilisation à l'hydrogène à l'étape de la galvanisation à chaud, la résistance à la rupture des tiges à haute résistance doit être inférieure à 1035 MPa. Ces dernières ne peuvent être pliées.

#### ASTM A193/A193M

- grade B7 : tiges d'ancrage à haute résistance.

#### ASTM A449

- tiges d'ancrage à haute résistance.

#### CSA G40.20/G40.21

- aciers de nuance 350W : tiges d'ancrage d'usage général.

### 3.3 Boulons en U en acier inoxydable pour structures de signalisation

Le diamètre nominal des boulons en U figurant sur les plans s'applique aussi bien à la partie filetée qu'à la partie non filetée.

#### ASTM F593

- boulons en acier inoxydable en alliage de la série 300.

### 3.4 Écrous

#### ASTM A194/A194M

- utilisés avec les tiges d'ancrage ASTM A193/A193M.

#### ASTM A563

- les écrous à utiliser sont ceux qui figurent dans la colonne « Recommended » du tableau X1.1 « Nut and Bolt Suitability Guide » de la norme précitée.

#### ASTM F594

- utilisés avec les boulons et les tiges filetées conformes à la norme ASTM F593.

### 3.5 Rondelles

#### ASME B18.21.1

- rondelles standards;
- rondelles à ressort.

#### ASTM F436/F436M

- type 1 : rondelles en acier au carbone;
- type 3 : rondelles en acier à résistance améliorée à la corrosion atmosphérique.

### 3.6 Revêtement

La galvanisation des boulons et des tiges d'ancrage doit être conforme à la norme ASTM A153/A153M « Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware » ou à la norme ASTM A123/A123M « Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel

Contenu normatif



**NORME**

PIÈCES MÉTALLIQUES

**6.2 Boulons, tiges d'ancrage,  
écrous et rondelles en acier**

**Boulons, tiges d'ancrage,  
écrous et rondelles en acier**

Tome <b>VII</b>	
Chapitre <b>6</b>	Norme <b>6201</b>
Page <b>3 de 3</b>	
Date <b>2018 12 15</b>	

Products », à l'exception des boulons qui sont conformes aux exigences de la norme ASTM F3125/F3125M « Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions », grade F1852. Les boulons conformes aux exigences de la norme ASTM F3125/F3125M « Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions », grade A490 ne doivent pas être galvanisés ni électroplaqués.

Les tiges d'ancrage peuvent être galvanisées soit entièrement, soit partiellement sur la partie filetée.

Les écrous et les rondelles doivent avoir le même fini que les boulons et les tiges d'ancrage.

**3.7 Marquage**

Les boulons, les écrous et les rondelles doivent être marqués conformément aux exigences de la norme de référence régissant le produit.

Contenu normatif

## **Part 1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 All sections of Division 1 – *General Requirements*.
- .2 Section 09 91 13.23 – *Exterior Painting of Structural Steel*.

### **1.2 REFERENCE STANDARDS**

- .1 American Association for State Highway and Transportation Officials (AASHTO)
  - .1 AASHTO, *Standard Specifications for Highway Bridges*, last edition.
- .2 ASTM International
  - .1 ASTM A325M, last edition, *Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength*.
  - .2 ASTM A490M, last edition, *Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints*.
- .3 CSA Group
  - .1 CSA G40.20/G40.21, last edition, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2 CAN/CSA G164, last edition, Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA S6, last edition, Canadian Highway Bridge Design Code.
  - .4 CSA S16, Design of Steel Structures.
  - .5 CSA S269, last edition, Falsework for Construction Purpose.
  - .6 CSA W48, last edition, Filler Metals and Allied Materials for Metal Arc Welding.
  - .7 CSA W59, last edition, Welded Steel Construction (Metal Arc Welding).
- .4 Ministère des Transports du Québec
  - .1 *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation*
  - .2 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 6101, *Acier de construction*.
  - .3 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 6201, *Boulons, tiges d'ancrage, écrous et rondelles d'acier*.
- .5 Green Seal Environmental Standards (GS)
  - .1 GS-11, last edition, Paints, Coatings, Stains and Sealers.

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for construction steel and hardware. Product Data must include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Safety Data Sheet (SDS):
  - .1 Submit two (2) copies of WHMIS SDS in accordance with Section 01 35 29.06 – *Health and Safety Requirements*.
- .4 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered with the Ordre des ingénieurs du Québec (OIQ).
  - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

#### **1.4 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00 – *Quality Control*.
- .2 Test Reports:
  - .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties in accordance with Section 01 33 00 – *Submittal Procedures*.
- .3 Certifications:
  - .1 Submit, two (2) weeks before beginning of work, product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – *Common Product Requirements* and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements:
  - .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground in dry location] and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse of packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - *Waste Management and Disposal*.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Steel sections and plates: to CSA G40.20/G40.21, Grade 350W.
- .2 Welding materials: to CSA W59.
- .3 Welding electrodes: to CSA W48 Series.
- .4 Bolts, nuts and washers: to ASTM A325M. Bolts in accordance with ASTM A490M may be used, subject to the approval of the Government Representative.
- .5 Anchor bolts, nuts and washers: to CAN/CSA G40.21 galvanised, grade 400W.

**2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.

**2.3 FINISHES**

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m<sup>2</sup> to CAN/CSA-G164.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Government Representative.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed from Government Representative.

**3.2 ERECTION - GENERAL**

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Government Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.

- .6 Make field connections .
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
  - .1 Primer: maximum VOC limit 250 g/L to GS-11.

### 3.3 PROTECTION

- .1 Protect installed materials et elements from damage during construction.
- .2 Repair damage to adjacent materials and equipment by installing metal works. The Contractor assume full responsibility for any claim resulting from the damage attributable to it.

### 3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: separate waste materials for reuse and/or recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

## **Part 1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 32 12 16 *Bituminous Pavement Covering*

### **1.2 REFERENCE STANDARDS**

- .1 ASTM International Inc.
  - .1 ASTM C836-05, Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Water-proofing Membrane for Use with Separate Wearing Course.
- .2 Canadian General Standards Board (CGSB)
  - .1 CGSB 37-GP-56M-80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .3 Ministère des transports du Québec
  - .1 Cahier des charges et devis généraux – *Infrastructures routières – Construction et réparation*
  - .2 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 3701, *Membrane d'étanchéité*.
  - .3 Liste des matériaux relatifs au béton éprouvés par le laboratoire des chaussées.
- .4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1 Data Product (DP).

### **1.3 DEFINITIONS**

- .1 Waterproofing membrane: an adhesive and water-impermeable covering placed on deck to protect concrete surfaces from the application of water with dissolved de-icing salts.
- .2 Protection board: a durable panel designed to act as a barrier between waterproofing membrane and asphalt overlay.

### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Convene pre-installation meeting one (1) week prior to beginning waterproofing Work, with Government Representative, during which will be examined:
  - .1 Verify project requirements.
  - .2 Review installation and substrate conditions.
  - .3 Review manufacturer's installation instructions and warranty requirements.

### **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Product Data:



- .1 Provide two (2) copies of most recent technical waterproofing components data sheets describing materials physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Provide two (2) copies of WHMIS SDS in accordance with 01 35 29.06 - *Health and Safety Requirements*.
- .3 Manufacturer s Certificate: certify that products meet or exceed specified requirements.
- .4 Manufacturer s Installation Instructions: indicate special precautions required for seaming the membrane.
- .5 Manufacturer’s field report: in accordance with Section 01 45 00 - *Quality Control*.
- .6 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

## 1.6 QUALITY ASSURANCE

- .1 Sampling requirements:
  - .1 Submit 1 litre of bonding layering from a sealed contained after mixing to uniformity.
  - .2 Submit 1 m<sup>2</sup> of membrane removed from a roll.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Store materials in a dry location, sheltered from weather, and in a manner so that they are not in contact with soil.
- .2 Store rolls of felt and membrane in upright position.
  - .1 Store membrane rolls with salvage edge up.
- .3 Remove only in quantities required for same day use.
- .4 Place plywood runways over completed Work to enable movement of material and other traffic.
- .5 Store sealants at +5 degrees C minimum.
- .6 Handle waterproofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.
- .7 Store and manage hazardous materials in accordance with Sections 01 35 29.06 - *Health and Safety Requirements* and 01 35 43 - *Environmental Procedures*.
- .8 Packaging Waste Management: remove for reuse of pallets, crates, padding, and packaging materials in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.
  - .2 Fold up metal banding, flatten and place in designated area for recycling.

## 1.8 SITE CONDITIONS

- .1 Give written notice to Departmental Representative at least 24 hours in advance to specify the date and time of application.

- .2 In the case of repair of existing slab surfaces, including repair of the exterior sides of the deck and concreting of a deck joint, apply the bonding layer after a minimum delay, following the concreting of the surfaces to be repaired, 8 days, or 7 days followed by a 24-hour period without precipitation.
  - .1 Period without precipitation begins after complete removal of curing materials and standing water on the deck.
- .3 For a new slab, install the waterproofing membrane between May 15 and November 1<sup>st</sup>.
- .4 Place bonding layer and waterproofing membrane only when ambient air temperature and concrete temperature, measured in the shade, are greater than 5°C and rising.
- .5 Placing of bonding layer or waterproofing membrane must not begin when precipitation is forecast; cease work if precipitation comes during placing.

## **Part 2 Products**

### **2.1 MEMBRANE**

- .1 Supply waterproofing membrane: Norm 3701 of the Ministère des Transports du Québec.
- .2 Bonding layer:
  - .1 Bonding layer is composed of a base coating of bitumen modified by SBS polymer (styrene-butadiene-styrene). Minimum content of SBS of modified bitumen must be 8% by volume.
- .3 Prefabricated sheets:
  - .1 Reinforced with non-woven polyester.
  - .2 Made with elastomeric bitumen SBS (styrene-butadiene-styrene) coating the synthetic reinforcing on both sides. The thickness of the layer of bitumen for fusion must be such as to permit adherence to the deck along entire sheet, without damaging reinforcing during fusion.
  - .3 Made with an upper protection layer of grey stone granules, applied at a maximum density of 1.2 kg/m<sup>2</sup> and embedded in the bitumen.
  - .4 Minimum thickness of prefabricated sheet, measured for full sheet, is 4.5 mm.

### **2.2 FLASHING**

- .1 Furnish flashing composed of plastic cement based on bitumen modified by SBS (styrene-butadiene-styrene) polymer.
- .2 Triangular flashing to have minimum height of 15 mm and minimum width of 50 mm.

### **2.3 BONDING LAYER**

- .1 Bonding layer must be that specified by the manufacturer of the waterproofing membrane.
- .2 For existing decks and new decks covered with a temporary overlay, bonding layer must be water-based.

## 2.4 JOINT WATERPROOFING

- .1 Waterproofing products: adhesive membrane from the list of « Membrane pour joints » of the « Liste des matériaux relatifs au béton éprouvés par le laboratoire des chausées » of the MTQ.

## Part 3 Execution

### 3.1 CLEANING SURFACES

- .1 Clean surfaces situated along and on the bottom 65 mm of curbs, sidewalks, bike paths, barriers, and deck joints in two steps, a base cleaning and a secondary cleaning. Base cleaning is carried out immediately after removal of existing overlay and waterproofing membrane. Secondary cleaning is carried out less than 48 hours before application of bonding layer for waterproofing membrane when concrete for repairs to the deck and mortar used to level deck surfaces are cured.
  - .1 Base cleaning: apply damp abrasive jet or high-pressure water in fashion so as to remove all laitance, all trace of rust on metal parts, all encrusted debris, all bituminous residue, etc. Surface so cleaned must then be washed of all debris with a pressurised water jet (pressure 15 MPa, flow 20 l/min, jet nozzle concentrated circular and nozzle-surface distance of 150 mm to 200 mm).
  - .2 Secondary cleaning: apply as indicated for cleaning of new deck. This cleaning is not required for zones of the deck levelled with hot-mix asphalt.
- .2 Immediately before correction of existing deck surfaces as well as before applying bonding layer for waterproofing membrane for existing and new decks, remove dust and debris with air jet. Equipment used for air jet must be equipped with a filter to capture oil; effectiveness of filter must be demonstrated before using equipment.
- .3 Clean or repair concrete surfaces dirtied by oily material.
- .4 Traffic is forbidden on deck from start of cleaning work for a new deck or secondary cleaning for an existing deck, except for that of vehicles required to place membrane.

### 3.2 APPLICATION OF WATERPROOFING MEMBRANE

- .1 Bonding layer:
  - .1 Apply one coat of bonding layer at rate of 0.15 l/m<sup>2</sup> on surfaces to be covered by waterproofing membrane; this rate is calculated before evaporation of solvent or water.
  - .2 Protect against splashing sidewalks, bicycle paths, curbs, barriers, fences, expansion joints, etc. by means of cloths or of other appropriate material; the bonding layer must be applied by roller along such elements for a width of 600 mm.
  - .3 Clean dirtied surfaces during execution of Work.

- .2 Waterproofing membrane:
  - .1 Accomplish application of membrane with aid of mechanised application equipment, except near deck joints, or with propane torch. A roller must be integrated into mechanised application equipment.
  - .2 Adjust fusion parameters on account of evenness of surface to be covered and weather conditions (force of wind, temperature, etc.), so as to obtain during application a surface of melted bitumen at least 20 mm in front of roll of membrane and squeezing out of bitumen along joints.
  - .3 Accomplish application of membrane starting from low points of area to be covered toward high point of transversal profile. Transverse joints must be shifted in a fashion so as not to place more than three membrane thickness at any point. The width of laps between membranes must be 75 mm for longitudinal joints and 150 mm for transverse joints.
  - .4 Place membrane as close as possible along curbs, sidewalks, bicycle paths, barriers, drains et deck joints, not to exceed a distance of 15 mm.
  - .5 Once the membrane has been placed, place flashing along curbs, sidewalks, bicycle paths, and barriers. No flashing may be placed along deck joints or near drains. Ensure that evacuation holes situated along drains are not obstructed by flashing. Flashing must be placed on dry and clean surfaces and when the concrete temperature of deck is greater than 5°C and the minimum temperature of flashing at moment of placing is 20°C.
  - .6 Refuse lap joints badly fused after placing each band of membrane.
  - .7 Once application is complete, carefully inspect membrane; air pockets and folds must be pierced and cover with a piece of membrane extending at least 100 mm beyond edge of membrane zone to be repaired.

### 3.3 PLACING ADHESIVE MEMBRANE FOR JOINT

- .1 Apply a tack coat at the rate of 0.15 l / m<sup>2</sup> on the surfaces to be covered with membrane; this rate is calculated before the solvent or water has evaporated.
- .2 The installation of the membrane must be done on clean and dry surfaces after a period between 12 and 24 hours following the installation of the bonding layer.
- .3 Apply self-adhesive membrane for joints after a minimum delay, after concreting the concrete surfaces to be covered with membrane, 14 days, whether 7 days of concrete curing followed by 6 days after the complete removal of the cure and a 24 hours period without precipitation. The 24 hours period begins after the complete removal of any standing water. This period of 14 days may however be reduced if the bonding layer is laid after a period of 3 consecutive days without precipitation after the complete removal of curing materials or any standing water following precipitation. The deadline must not be less than 10 days after concreting. For precast concrete elements, the self-adhesive membrane for joints must be installed after a minimum period of 24 hours without precipitation.
- .4 Remove dust and debris with an air jet immediately before installing the membrane. The equipment used for the air jet must be fitted with a filter that captures the oil. The effectiveness of the filter must be demonstrated before using the equipment.

- .5 If cleaning with water is necessary to obtain clean surfaces, this must be done before the 24 hours period without precipitation.
- .6 Heat the surfaces to be covered with a propane torch immediately before installing the membrane.

### 3.4 MEMBRANE PROTECTION

- .1 Provide and install signs and safety barriers, and keep them in good condition until the end of the work
- .2 At the end of each workday or when work is interrupted due to bad weather, protect the finished surfaces as well as the materials that have been removed from the premises or the storage area.

### 3.5 CLEANING

- .1 Remove bituminous markings from finished surfaces.
- .2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.
- .4 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Place materials defined as hazardous or toxic in designated containers.
  - .2 Clearly label location of salvaged material s storage areas and provide barriers and security devices.
  - .3 Ensure emptied containers are sealed and stored safely.
  - .4 Unused coating material must be disposed of at official hazardous material collections site as reviewed by Government Representative.
  - .5 Unused adhesive, sealant and asphalt materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
  - .6 Dispose of unused adhesive material at official hazardous material collections site approved by Government Representative.
  - .7 Dispose of unused sealant material at official hazardous material collections site approved by Government Representative.
  - .8 Dispose of unused asphalt material at official hazardous material collections site approved by Government Representative.

**END OF SECTION**

## APPENDIX 1 Waterproofing membrane



BÉTONS ET PRODUITS CONNEXES

3.7 Membrane d'étanchéité

Membrane d'étanchéité

**NORME**

Tome

**VII**

Chapitre	Norme
<b>3</b>	<b>3701</b>

Page
<b>1</b> de <b>4</b>

Date
<b>2008 12 15</b>

### 1. Objet

La présente norme a pour objet de déterminer les exigences du Ministère en ce qui a trait aux caractéristiques et aux critères d'évaluation d'une membrane d'étanchéité.

### 2. Références

La présente norme renvoie à l'édition la plus récente des documents suivants.

#### NORMES :

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM C 836 « Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Water-proofing Membrane for Use with Separate Wearing Course ».

OFFICE DES NORMES GÉNÉRALES DU CANADA

ONGC 37-GP-56 « Membrane bitumineuse modifiée, préfabriquée et renforcée, pour le revêtement des toitures ».

#### AUTRES DOCUMENTS :

LABORATOIRE CENTRAL DES PONTS ET CHAUSSÉES

« Caractéristiques mécaniques de matériaux en films et en feuilles » :

- Détermination de la composition d'une feuille d'étanchéité bitumineuse.
- Détermination des caractéristiques en traction.
- Détermination de l'adhérence.
- Détermination de l'imperméabilité.

### 3. Définition

La définition suivante s'applique à la présente norme :

#### Membrane d'étanchéité

Revêtement adhérent et imperméable à l'eau, mis en place sur une dalle sur poutre ou sur un tablier d'ouvrage d'art pour protéger les surfaces de béton contre l'arrivée d'eau chargée de sels de déglçage.

### 4. Caractéristiques requises

La membrane d'étanchéité comprend :

- une couche d'accrochage au béton;
- une feuille préfabriquée qui adhère à la surface de la dalle par fusion.

La couche d'accrochage est constituée par un enduit à base de bitume modifié par un polymère SBS (styrène-butadiène-styrène). La teneur minimale de SBS du bitume modifié doit être de 8 % en volume.

La feuille préfabriquée est constituée :

- d'une armature en polyester non tissée;
- d'un bitume élastomère SBS (styrène-butadiène-styrène) enrobant l'armature synthétique des deux côtés. L'épaisseur de la couche de bitume destinée à la fusion doit être telle qu'elle permette une adhérence en tout point de la feuille au support, sans endommager l'armature à l'occasion du soudage;
- d'une couche supérieure de protection constituée de gravillons minéraux de couleur grise, appliqués à un taux maximal de 1,2 kg/m<sup>2</sup> et incrustés dans le bitume.

L'épaisseur minimale de la feuille préfabriquée, mesurée en pleine feuille, est de 4,5 mm.

Contenu normatif

Tome <b>VII</b>	
Chapitre <b>3</b>	Norme <b>3701</b>
Page <b>2</b> de <b>4</b>	
Date <b>2008 12 15</b>	

BÉTONS ET PRODUITS CONNEXES

**3.7 Membrane d'étanchéité**

**Membrane d'étanchéité**



**NORME**

#### 4.1 Essais

Ces essais sont effectués avec une couche d'accrochage à base de solvant et avec une couche d'accrochage à base d'eau.

Pour les essais d'adhérence et de fissuration, le support de béton est préalablement enduit d'une couche d'accrochage appliquée au taux de 0,2 L/m<sup>2</sup>. Immédiatement après l'évaporation complète du solvant ou de l'eau, la feuille préfabriquée est collée par fusion au chalumeau.

##### 4.1.1 Détermination de la composition

L'essai est réalisé selon le mode opératoire LCPC « Détermination de la composition d'une feuille d'étanchéité bitumineuse », sur des éprouvettes de 50 x 100 mm extraites au trichloréthylène.

##### 4.1.2 Essai de traction

L'essai est réalisé sur des éprouvettes en forme d'haltère de 25 mm de largeur et de 85 mm de longueur (longueur mesurée entre les mâchoires), conformément au mode opératoire LCPC « Détermination des caractéristiques en traction ».

L'essai de traction comprend :

- un essai à 20 ± 1 °C, à une vitesse de 100 mm/min, sur des éprouvettes découpées dans les sens longitudinal et transversal;
- un essai à 20 ± 1 °C, à une vitesse de 100 mm/min, et un essai à -10 ± 1 °C, à une vitesse de 10 mm/min, sur des éprouvettes découpées dans le sens longitudinal, ayant subi un choc thermique à 140 °C, avec maintien de cette température pendant 10 min, puis décroissance jusqu'à 40 °C.

Les caractéristiques mécaniques sont données au tableau 3701-1.

Tableau 3701-1  
**Caractéristiques mécaniques de la feuille préfabriquée**

Vitesse d'étirement (mm/min)	Température pendant l'essai (°C)	Allongement minimal à la rupture (%)	Force minimale à la rupture (N/mm)
100	20	30	10
10	-10	20	—

##### 4.1.3 Essai de traction sur un collage

L'essai de traction est réalisé sur des éprouvettes découpées perpendiculairement au joint longitudinal, de telle sorte que le collage se trouve au centre de l'haltère.

L'essai de traction sur un collage sans choc thermique préalable comprend un essai à 20 ± 1 °C, à une vitesse de 100 mm/min, et un essai à -10 ± 1 °C, à une vitesse de 10 mm/min.

Les résultats de l'essai doivent correspondre à au moins 70 % des valeurs obtenues à l'occasion de l'essai de traction.

##### 4.1.4 Essai de perforation

Le diamètre de l'éprouvette est de 25 mm, le poinçon est une tige de 3 mm de diamètre, terminée par un cône d'angle au sommet de 30° dont l'extrémité est légèrement arrondie.

Les essais sont réalisés à 20 °C et -10 °C, à la vitesse de 500 mm/min.

La force de pénétration doit être supérieure à 80 N.

##### 4.1.5 Essai d'absorption d'eau

L'essai consiste à immerger dans l'eau une éprouvette de 100 x 100 mm pendant 5 jours, à 50 °C.

L'éprouvette ne doit pas absorber plus d'un gramme d'eau.

Contenu normatif





**NORME**

**4.1.6 Essai d'adhérence au support**

L'essai est réalisé selon le mode opératoire LCPC « Détermination de l'adhérence », à la température de  $20 \pm 1$  °C.

L'adhérence au support doit être supérieure à 0,4 MPa.

**4.1.7 Essai de souplesse à basse température**

L'essai est réalisé sur une éprouvette de 100 x 150 mm refroidie jusqu'à -10 °C et pliée à angle droit sur un mandrin de 25 mm de rayon en 2 secondes.

L'éprouvette ne doit présenter aucun signe de craquelage ou de fendillage.

**4.1.8 Essai d'imperméabilité**

L'essai est réalisé selon le mode opératoire LCPC « Détermination de l'imperméabilité ».

Une éprouvette de 150 mm de diamètre est soumise à une pression d'eau de :

- 0,1 MPa pendant 5 jours;
- 0,2 MPa pendant 1 jour;
- 0,3 MPa pendant 1 jour;
- 0,5 MPa pendant 1 jour.

Au cours de l'essai, on ne doit observer aucun passage d'eau.

**4.1.9 Essai de résistance au choc dynamique**

L'essai est réalisé sur des éprouvettes de 300 x 300 mm, conformément au mode opératoire « Essai de résistance au choc dynamique » décrit dans la norme ONGC 37-GP-56 « Membrane bitumineuse modifiée, préfabriquée et renforcée, pour le revêtement des toitures ».

Les essais doivent être effectués à des températures de  $23 \pm 2$  °C et  $-10 \pm 2$  °C.

Les éprouvettes doivent pouvoir résister à un choc de 4,9 J produit par une masse de

1 kg que l'on laisse tomber d'une hauteur de 500 mm, présenter une marque légère mais sans subir de perforation et être étanches à l'eau.

**4.1.10 Essai de résistance au choc statique**

L'essai est réalisé sur des éprouvettes de 200 x 200 mm, conformément au mode opératoire « Essai de perforation statique » décrit dans la norme ONGC 37-GP-56 « Membrane bitumineuse modifiée, préfabriquée et renforcée, pour le revêtement des toitures ».

Les éprouvettes doivent pouvoir résister à une force de 245 N exercée à  $23 \pm 2$  °C pendant une heure, présenter une marque légère mais sans subir de perforation et être étanches à l'eau.

**4.1.11 Détermination du pouvoir de colmatage des fissures**

L'essai est réalisé conformément à la norme ASTM C 836 « Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course ».

À une température de -20 °C, après 10 cycles de dilatation et de compression, à une vitesse de 3 mm/h, ouvrant à 3 mm, l'éprouvette ne doit présenter aucun signe de craquelage, de fendillement ou de perte d'adhérence.

**4.1.12 Détermination de la stabilité sous l'enrobé**

La feuille préfabriquée est préalablement enduite d'une émulsion anionique à rupture lente (SS-1) au taux résiduel de 0,15 l/m<sup>2</sup>, puis recouverte d'une couche de 65 mm d'épaisseur d'enrobé de type EB-10S, mis en place à 160 °C et densifié à 94 % de la densité maximale du mélange avec des pneumatiques gonflés à 0,6 MPa.

Contenu normatif



Tome <b>VII</b>	
Chapitre <b>3</b>	Norme <b>3701</b>
Page <b>4</b> de <b>4</b>	
Date <b>2008 12 15</b>	

BÉTONS ET PRODUITS CONNEXES
<b>3.7 Membrane d'étanchéité</b>
<b>Membrane d'étanchéité</b>



**NORME**

La plaque est découpée en quatre parties et l'on procède sur la coupe à un examen visuel de la feuille préfabriquée et de l'enrobé afin de déceler d'éventuelles anomalies.

Deux quarts de la plaque sont ensuite introduits pendant 2 heures dans une étuve à 100 °C. La feuille préfabriquée est désolidarisée manuellement du support et de l'enrobé, en prenant soin de ne pas détruire ce dernier, afin d'examiner son aspect à l'interface avec la feuille. Une fois récupérée, la feuille est examinée par transparence pour déceler les perforations.

Sur un quart de la feuille ainsi récupérée, le liant bitumineux est extrait à l'aide de trichloréthylène afin de récupérer l'armature. Une fois sèche, celle-ci est également examinée par transparence pour en constater l'état.

Des observations visuelles portant sur les points suivants doivent démontrer la stabilité de la feuille préfabriquée sous l'enrobé :

- adhérence entre la feuille préfabriquée et l'enrobé, et entre la feuille préfabriquée et le support;
- tenue de la feuille préfabriquée (déformation, perforations).

#### 4.2 Étiquetage

Les produits constituant la membrane d'étanchéité doivent être livrés dans des contenants ou emballages scellés et comprendre les indications suivantes :

- les noms du fabricant et du produit;
- les instructions concernant l'application;
- le numéro du lot de production;
- le volume des contenants de la couche d'accrochage.

Contenu normatif

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 05 12 33 – *Structural steel for bridges*

**1.2 PRICE AND PAYMENT PROCEDURES**

- .1 Temporary accesses required to perform onsite cleaning and painting of steel elements on Gauron Bridge (7) are covered by Submission slip items;
- .2 Containment system required to perform onsite cleaning and painting of steel elements on Gauron Bridge (7) are covered by Submission slip items;
- .3 Cleaning and painting of steel surfaces of Gauron Bridge (7) superstructure and of new steel elements (except bolts, steel faced curb), are covered by Submission slip items;
- .4 Costs of heating containment enclosures for painting in cold weather are covered by specific payment items in the Submission slip.

**1.3 REFERENCE STANDARDS**

- .1 The Master Painters Institute (MPI)
  - .1 Exterior Structural Steel and Metal Fabrications.
    - .1 EXT 5.1D, Alkyd.
    - .2 EXT 5.1G, Polyurethane, Pigmented (over epoxy zinc rich primer and high build epoxy).
  - .2 Federal Standard (FS)
    - .1 FED-STD-595B, latest edition, *Colours Used in Government Procurement*.
  - .3 The Society for Protective Coatings (SSPC)
    - .1 SSPC-SP 1, latest edition, *Solvent Cleaning*.
    - .2 SSPC-SP 2, latest edition, *Hand Tool Cleaning*.
    - .3 SSPC-SP 3, latest edition, *Power Tool Cleaning*.
    - .4 SSPC-SP 6/NACE No. 3, latest edition, *Commercial Blast Cleaning*.
    - .5 SSPC-SP 7/NACE No. 4, latest edition, *Brush-off Blast Cleaning*.
    - .6 SSPC-Vis-1, latest edition, *Visual Standard for Abrasive Blast Cleaned Steel* (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).
    - .7 SSPC-SP 10/NACE No. 2, latest edition, *Near White Blast Cleaning*.
    - .8 SSPC-PA 2, latest edition, *Measurement of Dry Coat Thickness with Magnetic Gauges*.
    - .9 SSPC *Good Painting Practices*, Volume 1, 4th Edition.
  - .4 Ministère des Transports du Québec :

- .1 Cahier des charges et devis généraux – *Infrastructures routières – Construction et réparation*
- .2 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 10104, *Systèmes de peintures pour structures d'acier.*
- .3 Direction des structures, *Guide peinturage des charpentes métalliques.*

#### 1.4 PAINT ANALYSIS

- .1 Parks Canada Agency, owner of bridges Gauron (7) and Lafleur (7A) has carried out analyses of existing paint on these structures to determine lead content.
- .2 These analyses show lead content in paint varies between 0.72% et 1.88%.
- .3 The analysis report is attached to this section of the specifications in Appendix 1.
- .4 Existing steel surfaces are coated with a paint system containing lead.
- .5 Characterize liquid waste generated by surface preparation operations.
- .6 Consider solid residues generated by surface preparation work as hazardous materials.
- .7 Provide measures to manage waste generated during painting operations.

#### 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Provide manufacturer s instructions, printed product literature and data sheets for painting exterior metal surfaces and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit two (2) copies of WHMIS SDS in accordance with Section 01 35 43 - *Environmental Procedures* and 01 35 29.06 - *Health and Safety Requirements.*
- .3 Samples:
  - .1 Submit samples for review and acceptance of each unit.
  - .2 Submit for review and acceptance colour samples of paint to be used on bridges to the Government Representative, at least fifteen (15) days before beginning of works. The paint colour samples will allow Parks Canada Agency representatives to choose which paint colour will be used to protect Bridge N° 7 (Gauron).
  - .3 Paint colour samples shall be similar to actual colour of paint covering steel structure of bridges.
  - .4 Incorporate approved colour sample into the topcoat colour of the chosen paint system.
  - .5 Choose paint systems as described in Part 2 of this section of the specifications.
  - .6 Enable Government Representative to take two (2) two (2) liter samples of each type of paint product delivered to the site; one (1) sample must be taken from the original containers and the other from the painters' cans.

- .4 Certificates:
  - .1 Submit documents signed by the manufacturer certifying that the products, materials and equipment comply with the physical characteristics and performance criteria.
  - .2 Ensure that certificates include the following information for each production lot:
    - .1 Name of manufacturer.
    - .2 Name of paint.
    - .3 Production lot number. A lot number corresponds to a batch number. For zinc powder, the production lot corresponds to the manufacturer's code.
- .5 Test Reports:
  - .1 Provide test reports showing compliance with specified performance characteristics and physical properties and in accordance with Section 01 45 00 - *Quality Control*.
  - .2 Ensure test reports include the following information:
    - .1 Title and date of the report.
    - .2 Non-volatile content (% by mass) according to ASTM D2369, *Standard Test Method for Volatile Content of Coating*.
    - .3 Pigment content (% by mass) according to ASTM D2371, *Standard Test Method for Pigment Content of Solvent Reducible Paints*.
    - .4 Density (kg/l) according to ASTM D1475, *Standard Test Method for Density of Liquid Coating, Inks and Related Products*.
    - .5 Consistency (K.U.) according to ASTM D572, *Standard Test Method for Consistency of Paints Measuring Krebs Units (KU) Viscosity Using a Stormer Type Viscometer*.
  - .3 Verify test results against approved values in paint systems product approval lists. A tolerance is associated with each value.
  - .4 If additional verification is required, provide Government Representative with infrared spectra of paint components according to ASTM D2621, *Standard Test Method for Infrared Identification of Vehicle Solids From Solvent Reducible Paints*.
  - .5 Submit management plan for construction waste in compliance with Section 01 74 19, *Waste Management and Disposal*.

## 1.6 QUALITY ASSURANCE

- .1 Certificates: Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .2 Government Representative performs an acceptance inspection on paints. Sampling method:
  - .1 For single-component paints and thinners, two (2) samples of one (1) litre each.
  - .2 For two-component paints, two (2) samples of each component, unmixed and taken in proportions recommended by the manufacturer.

- .3 For paint systems consisting of moisture-curing polyurethane resin paints, for each batch the manufacturer submits to the Government Representative two (2) one (1) litre samples of each paint and thinner in the original unopened containers.
- .4 Place samples in hermetically sealed one (1) liter containers of high-density polyethylene or metal with enamelled interior.

## 1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – *Common Product Requirements* and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Materials and materials shall be stored in a container heated to the temperature recommended by the supplier, but not less than 10 ° C.
- .4 Packaging waste management: recover pallets, crates, protective padding, paint and thinner containers and other packaging waste for recycling/reuse following the guidelines of the waste management plan in accordance with Section, 01 74 19 – *Waste Management and Disposal*.

## Part 2 Products

### 2.1 PAINT MATERIALS

- .1 New steel: apply a high-performance paint system complying with the MTQ Standard 10104.
- .2 Existing steel to be cleaned and repainted: apply maintenance paint system in accordance with MTQ Standard 10104
- .3 Paint system is to be chosen from among those included in the « Systèmes de peintures à haute performance » et « Systèmes de peintures d'entretien » product approval lists found on the Ministère des Transport du Québec (MTQ) Internet site.
- .4 Consider that the topcoat will be the same colour as the paint sample approved by PCA Project Manager and Government Representative.

## Part 3 Execution

### 3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for painting exterior metal surfaces installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Government Representative.
  - .2 Carry out tests to determine existence of lead base paint on existing exterior metal surfaces.

- .3 See analysis reports for existing paint attached in Appendix 1 of this section of the specifications.
- .4 Take all necessary measures in compliance with Section 02 83 12 - *Lead Base Paint Abatement – Maximum Precautions* and the federal, provincial and municipal regulations in effect in the territory of the City of Montreal for removal, recovery of existing paint removal materials and disposal of paint waste based on the results of the chemical analysis.
- .5 Begin painting only after removal, recovery and disposal of existing paint and following written approval from the Government Representative.

### 3.2 PREPARATION

- .1 Prior to repairing and / or replacing steel structural elements and inspection, remove existing paint, rust or non-adherent corrosion particles from metal surfaces according to the indications mentioned below.
- .2 New metal surfaces (in shop):
  - .1 Clean surfaces of new metal to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and foreign substances in accordance with the following:
    - .1 Near White Blast Cleaning: to SSPC-SP 10/NACE No. 2.
  - .2 Use dry abrasive blasting, without crystalline silica, to strip steel surfaces in accordance with SSPC-SP 10.
  - .3 Assess rust grades on unpainted steel surfaces and preparation grades following abrasive blasting of steel surfaces corresponding to the rust grades shown in photographs presented in SSPC-VIS 1-02, *Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning*. Use these photographs as examples only to complement written descriptions of preparation grades, which are the only specifications to follow.
  - .4 Strip surfaces inaccessible to dry abrasive blasting to obtain the minimum preparation grade in SSPC-SP 11, - *Power Tool Cleaning to Bare Metal*.
- .3 Metal surfaces to be repainted (on site):
  - .1 Work areas for cleaning and painting existing steel surfaces include:
    - .1 All surfaces of existing steel elements composing the superstructure, including all main trusses, floor beams, stringers, bracings, guardrails, assemblies and other;

.2 Execution:

- .1 Clean surfaces by removing loose, cracked, brittle or non-adherent paint, rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with following.
- .2 Commercial blast cleaning: to SSPC-SP 6/NACE No. 3.
- .3 The minimum degree of preparation of the steel surfaces depends on the chosen paint system.
- .4 Commercial blast clean rusted and bare metal surfaces where existing paint have failed.
- .5 Compressed air must be free of water and oil before exiting the nozzle.
- .6 Strip existing surfaces to remove most of the chloride on the surface to be painted.
- .7 Before painting, ensure that chloride content, following preparation, is below  $7 \text{ ug/cm}^2$  (grade NV-2, SSPC-SP 12).
- .8 Use quantitative testing to determine chloride quantities on surfaces with Chlor Test type sleeve or equivalent approved by Government Representative.
- .9 If chloride content exceeds  $7 \text{ ug/cm}^2$ , clean surfaces using « Chlor-Rid » type extraction agent or equivalent approved by Government Representative.
- .10 Use water in accordance with the following Table:

Parameter	Maximum concentration in water (mg/l)
Chloride	500
Sulphate (SO <sub>4</sub> )	3,000
Alkali (Na <sub>2</sub> O + 0.658K <sub>2</sub> O)	60
Total solids	50,000
pH	≥ 6
- .11 Blast joints and assemblies with compressed air to remove water or residual moisture before painting. For compressed air, use equipment fitted with a filter to trap oil; demonstrate filter effectiveness before using equipment.
- .12 Remove dust and other dirt from surfaces to be painted following stripping.
- .13 Remove from exterior metal surfaces any loose particles of paint, rust or corrosion.
- .14 Following stripping, remove dust and other dirt from floors, walls and joints of containment enclosures with compressed air or vacuum cleaner.
- .15 Do not apply paint before prepared surfaces have been inspected and approved by Government Representative
- .16 Before painting, ensure that the grade of surface cleanliness complies with SSPC-VIS 1.

- .17 Apply primer, paint or pre-treatment product after surface has been cleaned but before it begins to deteriorate.
- .18 Clean surfaces again if rust appears after preparation.
- .3 Mixing paint:
  - .1 Refer to the recommendations of the manufacturer of the chosen paint system.
  - .2 Do not dilute or thin paint for brush application.
  - .3 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
  - .4 Do not mix or keep paint in suspension by means of air bubbling through paint.
  - .5 Thin paint for spraying according to manufacturer's written instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to the Government Representative.
- .4 Painting new metal surfaces
  - .1 Apply each shop coat of paint so that each coat produces a dry film in accordance with minimum thickness specified by the manufacturer during the product approval process.

### 3.3 APPLICATION

- .1 Manufacturer's Instructions:
  - .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.



- .2 Application times for first coats:
  - .1 Apply, over entire clean surface, a first coat of paint as soon as possible after preparation and before onset of surface rust, do not exceed eight (8) hours for zinc paint systems or high performance paint systems, respectively approved in accordance with MTQ Standard 10104 (Volume VII), or twenty-four 24 hours for organic paint systems or maintenance systems, respectively approved in accordance with MTQ Standard 10104 (Volume VII).
- .3 Application times for topcoat:
  - .1 Apply topcoat in accordance with manufacturer's specifications in data sheets, do not exceed seven-day maximum following application of first coat.
- .4 Before applying first two coats of paint system, use a brush to completely coat rivets, bolts, nuts, welds, assembly joints, corners and straight edges, to the satisfaction of Government Representative.
- .5 Spray paint each coat.
- .6 Stir paint during application when specified in manufacturer's data sheets.
- .7 Immediately brush out runs and other imperfections.
- .8 Where paint cannot be adequately applied with a spray gun, use a brush. Use daubers or sheepskins for difficult-to-reach areas.
- .9 Use dipping or roller coating method of application when specifically authorized by the Government Representative in writing.
- .10 Paint system application conditions:
  - .1 Apply paint to surfaces free of moisture and dust.
  - .2 Apply paint under the following conditions:
    - .1 Air and surface to be painted temperature is above 5°C.
    - .2 Temperature of surface to be painted is at least 3°C above dew point.
    - .3 Previous coat is dry.
- .11 Supply cover when paint must be applied in damp or cold weather. Supply, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified. Protect until paint is dry or until weather conditions are suitable.
- .12 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .13 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .14 Brush application:
  - .1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers or sheepskins.
  - .2 Brush out runs and sags.
  - .3 Remove runs, sags and brush marks from finished work and repaint.
- .15 Spray application:

- .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Provide collectors or separators to remove oil and water from compressed air and drain periodically during operations.
  - .3 Keep paint ingredients properly mixed in spray tank or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
  - .4 Apply paint in uniform layer, with overlapping at edges of spray pattern.
  - .5 Brush out immediately runs and sags.
  - .6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.
  - .7 Remove runs, sags and brush marks from finished work and repaint.
- .16 Shop painting:
- .1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.
  - .2 Spray only priming paint on contact surfaces of bolted joints, friction type, assembled on site. Avoid brushing over these surfaces after spraying.
  - .3 Do not paint metal surfaces which are to be embedded in concrete.
  - .4 Paint metal surfaces to be in contact with wood with either full paint coats specified or three (3) shop coats of specified primer.
  - .5 Do not paint metal within 50 mm of edge to be welded. Give unprotected steel one coat of approved primer after shop fabrication is completed.
  - .6 Remove weld spatter before painting. Remove weld slag and flux by methods as specified in paragraph 3.2.3 Metal Surfaces to be Repainted.
  - .7 Protect machine finished or similar surfaces that are not to be painted but that do require protection, with coating of rust inhibitive petroleum, molybdenum disulphide, or other coating approved by the Government Representative.
  - .8 Copy previous erection marks and weight marks on areas that have been shop painted.
- .17 Field painting:
- .1 Paint steel structures as soon as possible after installation.
  - .2 The contact surfaces of parts to be assembled by bolting must not be painted except for a distance of 5 mm around the edge of one of the parts to be assembled so that all visible steel surfaces of the assembly are coated. after assembly.
  - .3 Bolts connecting steel elements painted in the factory must be painted on site after being degreased; the paint system and the color of the finishing coat must be identical to those used at the factory for the parts to be assembled. However, a zinc paint and organic binder should be used if a zinc paint and inorganic binder is provided as the first coat. The first two layers of the paint system must be brushed.
  - .4 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field

- connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.
- .5 Field paint surfaces (other than joint contact surfaces) which are accessible before erection, but which are not to be accessible after erection.
  - .6 Apply topcoat of paint after concrete work is completed or as directed by the Government Representative. If concreting or other operations damage paint, clean and repaint damaged area. Remove concrete spatter and droppings before paint is applied.
  - .7 Where painting does not meet with requirements of specifications, and when so directed by the Government Representative, remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.
- .18 Painting in cold weather:
- .1 Heat containment enclosures to minimum temperatures specified in this section of the specifications for ambient air and metal surfaces to be painted.
  - .2 Extend heating period during curing period in accordance with manufacturer's written instructions.
  - .3 For reimbursement of heating costs see Section 01 29 00 – *Payment*.
- .19 Handling painted metal components:
- .1 Handle painted metal after paint has dried, or when necessary for handling for painting or stacking for drying.
  - .2 Scrape off and touch up paint which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

### 3.4 FIELD QUALITY CONTROL

- .1 Site Tests, Inspections:
- .1 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC-PA 2.

### 3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: separate waste materials for reuse/ recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### 3.6 PROTECTION

- .1 Protect painted surfaces from damage during construction.
- .2 Protection surfaces not to receive paint.

- .1 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
- .2 Protect cleaned and freshly painted surfaces from dust to approval of the Government Representative.
- .3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

#### **Part 4 Galvanization**

##### **4.1 SURFACES TO BE TREATED**

- .1 Hardware must be galvanized.
- .2 Use hot dip galvanization for steel elements.

##### **4.2 PRICE AND PAYMENT PROCEDURES**

- .1 No payment item in Submission Slip for galvanizing hardware. Include price for galvanizing in *Structural Steel for Bridge* payment item.

##### **4.3 QUALITY ASSURANCE**

- .1 Certification of compliance
  - .1 For each delivery of galvanized steel elements, provide the Government Representative with a certificate of compliance including the following information:
    - .1 Name of galvanization company
    - .2 Date and location of galvanization
    - .3 Coating thickness
    - .4 Coating adherence
    - .5 Coating quality
  - .2 Acceptance inspection
    - .1 Parks Canada Agency acceptance inspection involves testing thickness, adhesion and quality of the coating in accordance with ASTM A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .3 Implementation
  - .1 Preparation of surfaces
    - .1 Ensure that steel surfaces are clean and free of paint, grease, rust, etc.
    - .2 Use appropriate methods to remove loose mill scale, welding slag and thick deposits of paint and rust.
    - .3 Perform final cleaning by immersion of steel pieces in a bath of dilute sulfuric or hydrochloric acid.

- .4 Following final cleaning, immerse steel parts in an aqueous solution of zinc chloride and ammonium.
- .2 Galvanization process
  - .1 Perform galvanization in accordance with ASTM A123/A123M, *Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products*.
  - .2 Apply minimum galvanization thickness of 87 µm.
  - .3 Ensure galvanized steel parts supplied and installed are free of white rust.
- .3 Protection of galvanized components
  - .1 Protect galvanized components from damage during handling and storage.
  - .2 Protect components that come into contact with lifting equipment, such as cables and chains.
  - .3 Store galvanized components so that air circulates between components, water does not accumulate and runs off and there is no metal-to-metal contact of galvanized parts.
- .4 Repairs following galvanization
  - .1 Repair surfaces damaged of ten (10) cm<sup>2</sup> or less using a brush to apply two (2) coats of a zinc-rich coating in accordance with CAN/CGSB 1.181, *Ready Mixed Organic Zinc-Rich coating*.
    - .1 Clean damaged surfaces before treatment in accordance with SSPC-SP 5/NACE No. 1, *Power Tool Cleaning to Bare Metal*.
    - .2 Ensure minimum dry film thickness of 130 µm.
  - .2 Re-galvanize surfaces damaged over an area greater than ten (10) cm<sup>2</sup>.
    - .1 Clean surfaces to be repaired in accordance with SSPC-SP 5/NACE No. 1, *White Metal Blast Cleaning*.

**END OF SECTION**

## APPENDIX 1

### Paint analysis of the Gauron (7) and Lafleur (7A) bridges



## RAPPORT D'INTERVENTION

Dossier n° :	010-P-0002065-0-00-100-02-MC-0001-00	Date d'intervention :	Le 25 mars 2013
Client/Entrepreneur :	Agence Parcs Canada Unité de gestion de l'Ouest du Québec a/s M. René Bernard, ing. (rene.bernard@pc.gc.ca)	Lieu d'intervention :	Ponts 7 et 7A Ville Lasalle (Montréal)
Nom du projet :	Ponts Lafleur et Gauron, Ville Lasalle Prélèvement de peinture Analyse de la teneur en plomb		
Type d'intervention :	<input checked="" type="checkbox"/> validation <input type="checkbox"/> relance <input type="checkbox"/> rencontre <input type="checkbox"/> autres	Interlocuteur :	
<i>autres – spécifiez :</i>		Cellulaire :	

**RÉSUMÉ :** PRÉLÈVEMENT D'ÉCHANTILLONS DE PEINTURE SUR LA STRUCTURE DES PONTS LAFLEUR ET GAURON DANS L'ARRONDISSEMENT VILLE LASALLE À MONTRÉAL

Le 25 mars 2013, nous sommes intervenus aux ponts Lafleur et Gauron, dans l'arrondissement Ville Lasalle à Montréal, pour prélever des échantillons de peinture sur la structure d'acier dans le but de caractériser la teneur en plomb de la peinture.

Notre mandat consistait à prélever des échantillons de peinture pour vérifier si du plomb était présent dans les éléments de la charpente métallique et de déterminer si ces éléments doivent faire l'objet d'un traitement particulier lors du démantèlement et de la mise au rebut.



Ponts Lafleur et Gauron sur les avenues St-Pierre et Dollard





## RAPPORT D'INTERVENTION

### Méthode et emplacement des échantillons prélevés

Afin d'obtenir une vue d'ensemble de la peinture, nous avons prélevé nos échantillons à trois emplacements différents sur chacun des ponts. Un échantillon par pont a été prélevé. Chaque échantillon représente donc le cumulatif de trois emplacements différents sur chacun des ponts.

En somme, deux échantillons ont été prélevés :

1. Échantillon du pont ave. St-Pierre/ave. Dollard direction sud;
2. Échantillon du pont ave. St-Pierre/ave. Dollard direction nord

La méthode utilisée pour les prélèvements est la suivante :

Au décapant en pâte pour peinture de marque Circa 1850

Échantillonnage par voix humide.

Les échantillons ont été prélevés à partir de différents éléments de la charpente métallique, c'est-à-dire les colonnes, les diagonales et les plaques de renfort (voir photos).



Échantillon avant prélèvement (pont ave. St-Pierre/ave. Dollard direction sud) pris depuis les plaques de renfort



Échantillon avant prélèvement (pont ave. St-Pierre/ave. Dollard direction nord) pris depuis les plaques de renfort et une colonne



## RAPPORT D'INTERVENTION

### Aspect visuel de la peinture sur la structure d'acier

Nous avons observé que la peinture était de couleur turquoise sur la structure d'acier. Quelques marques de corrosion étaient présentes sur les éléments d'acier. La peinture était fortement liée à la structure. De ce fait, il nous a été impossible de prélever des échantillons secs.

Lors de nos prélèvements, une attention particulière a été apportée à prélever de la peinture jusqu'au métal sain, c'est-à-dire avec l'apprêt de la peinture. Notre méthode d'échantillonnage par voie humide (décapant) ne nous a pas révélé la présence d'un apprêt de peinture. Les photos suivantes démontrent les surfaces de peinture à la suite de nos prélèvements.



Échantillon après prélèvement (pont ave. St-Pierre/ave. Dollard direction sud) pris depuis les plaques de renfort



Échantillon après prélèvement (pont ave. St-Pierre/ave. Dollard direction nord) pris depuis les plaques de renfort et une poutre

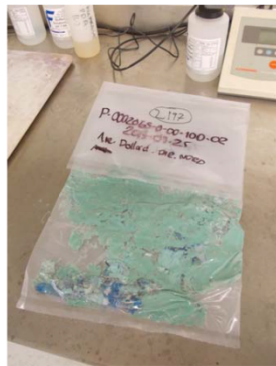




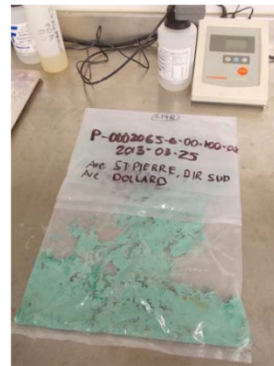
## RAPPORT D'INTERVENTION

### Résultat d'analyse

L'analyse de la teneur en plomb a été effectuée par spectrophotométrie à absorption atomique et les teneurs en plomb sont de l'ordre de 0.72 à 1.88%.



Échantillon de peinture  
(pont ave. St-Pierre/ave. Dollard direction  
nord)



Échantillon de peinture  
(pont ave. St-Pierre/ave. Dollard direction  
Sud)

### Conclusion et recommandations

Normalement, les poutres recouvertes de peinture au plomb sont considérées comme des déchets dangereux et doivent être traitées avant la mise au rebut. Selon l'EPA (Environmental Protection Agency), on appelle une peinture au plomb, toute peinture présentant une concentration égale ou supérieure à  $1,0 \text{ mg/cm}^2$  ou 0,5% par masse. À partir de ce moment, l'enlèvement du revêtement devrait suivre la procédure émise par l'OSHA (Occupational Safety and Health Administration).


Suivant ces résultats, un enlèvement du revêtement par jet d'abrasif, le cas échéant, entraînera un dépassement de la valeur maximale de la teneur en plomb établie par la Loi sur la santé et la sécurité du travail c. S-2.1, r.19.01. Par conséquent, les travaux doivent être réalisés conformément à la Loi sur la santé et la sécurité du travail (L.R.Q., c. S-2.1) et la Loi sur la qualité de l'environnement (L.R.Q., c. Q-2).

Les résidus liquides ou solides qui seront récupérés devront être traités suivant le règlement sur les matières dangereuses (Décret 1310-97, du 8 octobre 1997) (Québec) sans mesures particulières requises lors de la présence de plomb.



## RAPPORT D'INTERVENTION

/ab

<b>Observations importantes :</b> <b>La teneur en plomb de la peinture prélevée sur les éléments de la charpente métallique des ponts Lafleur et Gauron est de l'ordre de &lt;0,01%.</b>	
Technicien : Keven Pelletier, ing. jr O.I.Q. n° 5027078 CSA W178.2 niveau 1	Date : Le 3 avril 2013
Vérifié par :   Bernard Perron, B. Ens. Certifié NACE Directeur de projets Superviseur CSA W178.2 niveau 3 n° 746	Date : Le 3 avril 2013
c.c. : M. Dominic Pierre (Agence Parcs Canada) ( <a href="mailto:dominic.pierre@pc.gc.ca">dominic.pierre@pc.gc.ca</a> ) Mme Christine Lacasse (Dessau) ( <a href="mailto:christine.lacasse@dessau.com">christine.lacasse@dessau.com</a> ) M. Yvan Bruneau (Dessau) ( <a href="mailto:yvan.bruneau@dessau.com">yvan.bruneau@dessau.com</a> ) M. Jean Lizotte (Dessau) ( <a href="mailto:jean.lizotte@dessau.com">jean.lizotte@dessau.com</a> )	
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## **Part 1 General**

### **1.1 SUMMARY**

1. This Section includes requirements for selective demolition and removal of electrical installations.
2. Selective demolition works shall consist, but are not limited to, the removal and disposition, in whole or in part, of the following equipment and networks:
  1. Electrical distribution, including electrical distribution panels, circuit breakers, cabinet, contactors, conduits, wiring, expansion joints, hardware, and accessories;
  2. Lighting fixtures, lamp posts, and controls.

### **1.2 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical*.

### **1.3 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CSA S350 M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

### **1.4 DEFINITIONS**

- .1 Demolish: Dismantle items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel, taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged or removed and reinstalled.
- .3 Remove and Salvage: Dismantle items from existing construction and deliver them to Government Representative ready for reuse.
- .4 Remove and Reinstall: Dismantle items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are maintained onsite.
- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment, if handled improperly, as defined by Federal Hazardous Products Act (RSC 1985), including latest amendments.

### **1.5 ADMINISTRATIVE REQUIREMENTS**

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.

## **1.6 QUALITY ASSURANCE**

- .1 Regulatory Requirements: Perform work of this Section in accordance with:
  - .1 Provincial/Territorial Workers' Compensation Boards/Commissions.

## **1.7 SITE CONDITIONS**

- .1 Existing Conditions: Condition of materials identified as being salvaged or demolished are based on their observed condition at time of site examination, before tendering.
- .2 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in Work; immediately notify Government Representative if materials suspected of containing hazardous substances are encountered and perform following activities:
  - .1 Hazardous substances will be as defined in Hazardous Products Act.
  - .2 Stop work in area of suspected hazardous substances.
  - .3 Take preventative measures to limit users' and workers' exposure. Provide barriers and other safety devices and do not disturb.
  - .4 Hazardous substances will be removed by Government Representative under a separate contract or as a change to Work.
  - .5 Proceed only after written instructions have been received from Government Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Electrical Repair Materials: Use only new materials, CSA or ULC labelled as appropriate and matching components remaining after work associated with components identified for removal or demolition are completed.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Existing Conditions: Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Government Representative will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.

### **3.2 PREPARATION**

- .1 Protection of existing systems to remain: Protect systems and components indicated to remain in place during selective demolition operations and as follows:
  - .1 Prevent movement and install bracing to prevent settlement or damage of adjacent services and parts scheduled to remain;

- .2 Notify Government Representative and cease operations where safety of adjacent structures or services appears to be endangered and await additional instructions before resuming demolition work specified in this Section.

### **3.3 EXECUTION**

- .1 Coordinate requirements of this Section as follows:
  - .1 Remove existing luminaires, electrical devices and equipment including associated conduits, boxes, wiring, and similar items, unless specified otherwise;
  - .2 Perform demolition work in a neat and workmanlike manner:
    - .1 Remove tools or equipment after completion of work and leave site clean and ready for subsequent renovation work;
    - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.
  - .3 Remove existing conduits, boxes, cabling and wiring, as indicated;
  - .4 Seal open ends of conduit with silicone sealant where they are inaccessible or cannot be removed without damaging adjacent construction.

### **3.4 CLOSEOUT ACTIVITIES**

- .1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre).

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes and Fittings.
  - .2 CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC).
  - .1 EEMAC 1Y-2-1961, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 National Electrical Manufacturers Association (NEMA).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature, and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Sustainable Design Submittals:
  - .1 Construction Waste Management:
    - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - *Closeout Submittals.*
- .2 Operation and Maintenance Data: Submit operation and maintenance data for wire and box connectors for incorporation into manual.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store and handle materials in accordance with the manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

- .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - *Waste Management and Disposal*.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Pressure Type Wire Connectors: To CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors, as required.
- .2 Fixture Type Splicing Connectors: To CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing Stud Connectors: To NEMA and to consist of:
  - .1 Connector body and stud clamp for round copper conductor.
  - .2 Clamp for stranded copper conductors.
  - .3 Stud clamp bolts.
  - .4 Bolts for copper conductors.
  - .5 Sized for conductors as indicated.
- .4 Clamps or connectors for armoured flexible conduits, as required, to CAN/CSA-C22.2 No.18.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from Government Representative.

### **3.2 INSTALLATION**

- .1 Remove insulation carefully from ends of conductors and cables, and, depending, proceed with the following:
  - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation must meet secureness tests in accordance with CAN/CSA-C22.2 No.65;



- .2 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap;
- .3 Install bushing stud connectors in accordance with pertinent NEMA Regulations and in accordance with the manufacturer's recommendations.

### 3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*
- .2 Section 26 05 20 - *Wire and Box Connectors (0-1000 V).*
- .3 Section 26 05 43.01 - *Installation of Cables in Trenches and in Ducts.*

**1.2 REFERENCE STANDARDS**

- .1 Canadian Standards Association (CSA)/CSA International.
  - .1 CSA C22.2 No. 0.3, Testing Methods for Electrical Cables and Wires.

**1.3 PRODUCT DATA**

- .1 Provide product data in accordance with Section 01 33 00 - *Submittal Procedures.*

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - *Waste Management and Disposal.*

**Part 2 Products**

**2.1 WIRES**

- .1 Conductors: Stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper Conductors: Size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE.

**Part 3 Execution**

**3.1 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - *Common Work Results for Electrical.*
- .2 Perform the tests according to the methods approved by the local Authority Having Jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

**3.2 GENERAL - CABLE INSTALLATION**

- .1 Terminate cables in accordance with Section 26 05 20 - *Wire and Box Connectors - (0-1000 V).*
- .2 Cable Colour Coding: To Section 26 05 00 - *Common Work Results for Electrical.*
- .3 Conductor length for parallel feeders to be identical.

- .4 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend.

### **3.3 INSTALLATION OF WIRES**

- .1 Install wiring:
  - .1 In conduits, in accordance with Section 26 05 34 - *Conduits, Conduit Fastenings and Conduit Fittings*.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*

**1.2 REFERENCE STANDARDS**

- .1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE).
  - .1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit manufacturer's instructions to install the grounding products. Printed product literature and data sheets for grounding equipment must include product characteristics, performance criteria, physical size, finish, and limitations.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - *Closeout Submittals.*
- .2 Operation and Maintenance Data: Submit operation and maintenance data for grounding equipment for incorporation into manual.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with the manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoor, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - *Waste Management and Disposal.*

**Part 2 Products**

**2.1 EQUIPMENT**

- .1 Insulated Grounding Conductors: Green, copper conductors, size as indicated.

- .2 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including, but not necessarily limited to:
  - .1 Grounding and bonding bushings.
  - .2 Protective type clamps.
  - .3 Bolted type conductor connectors.
  - .4 Bonding jumpers, straps.
  - .5 Pressure-wire connectors.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate/supports.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.2 INSTALLATION - GENERAL**

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Install connectors in accordance with manufacturer's instructions.
- .2 Protect exposed grounding conductors from mechanical injury.
- .3 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .4 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.
- .5 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

#### **3.3 SYSTEM AND CIRCUIT GROUNDING**

- .1 Install system and circuit grounding connections.

#### **3.4 EQUIPMENT GROUNDING**

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list: Service equipment, duct systems, distribution panels, and outdoor lighting.

#### **3.5 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - *Common Work Results for Electrical*.

- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of the local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

### **3.6 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.

**1.3 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - *Common Product Requirements* with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors, in dry location, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect hangers and supports from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

**Part 2 Products**

**2.1 SUPPORT CHANNELS**

- .1 "U" shape, size 41 x 41 mm, 2.5 mm thick, set in poured concrete walls and ceilings, suspended, or surface mounted.
- .2 Hot-dipped galvanized steel supports.
- .3 Fasteners made of hot-dipped galvanized steel.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate.
- .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from the Government Representative.

### 3.2 INSTALLATION

- .1 Support equipment, conduit, or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .2 Fasten exposed conduit or cables to structure or support system using clamps.
- .3 For surface mounting of two or more conduits use "U"-channels at a maximal 1.5-m interval.
- .4 Provide metal brackets, frames, hangers, clamps, and related types of support structures where indicated or as required to support conduit and cable runs.
- .5 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .6 Do not use wire lashing or perforated strap to support or secure raceways or cables.

### 3.3 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**



**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CSA C22.1-F-15, Canadian Electrical Code, Part 1, 23<sup>rd</sup> Edition.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature, specifications, and data sheets, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Provide Shop Drawings: In accordance with Section 01 33 00 - *Submittal Procedures.*
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal.*

**Part 2 Products**

**2.1 JUNCTION AND PULL BOXES**

- .1 Construction: Cast-iron enclosure.
- .2 Covers Surface Mounted: Threaded.
- .3 Crouse-Hinds, GUA Series or approved equivalent.

**2.2 CEMA 3R EXTERIOR CABINET**

- .1 Description:
  - .1 304 stainless steel cabinet, 12 AWG thick, CSA3 (CEMA 3R), weatherproof. The Contractor is responsible for determining the dimensions required to incorporate all electrical power and distribution equipment and lighting controls. The dimensions given on the drawings are minimal.
  - .2 Stainless-steel hardware.

- .3 12 AWG thick 304 stainless steel door.
- .4 Piano hinge in stainless steel.
- .5 Door with three-point closing mechanisms with tapered-tipped steel rods with padlock handle in stainless steel and Corbin locks No. 5R-6352. Stainless-steel fixed bar door retainer.
- .6 Galvanized steel mounting plates.
- .7 Neoprene sealing pad.
- .8 Ventilation louvres with mosquito nets, filters, and deflectors supplied and installed by the manufacturer. Allow for each side of the cabinets.
- .9 Finish: Painted green color identical to the color of the bridge.
- .10 Provide free space for the addition of equipment for 20% of the interior surface. In addition, a minimum clearance must be provided between the equipment and the enclosure walls. Allow a minimum of 100 mm at the sides and in the top and 300 mm at the bottom.

### **Part 3 Execution**

#### **3.1 JUNCTION, PULL BOXES, AND CABINETS INSTALLATION**

- .1 Install pull boxes in inconspicuous, but accessible locations.
- .2 The junction and pull boxes are not indicated. Install pull boxes in order to ensure the conduits between each box have a length inferior to 30 m and in such a way to not have more than two 90° bends.
- .3 All the junction or pull boxes must be of appropriate size, according to the number of conductors and the associated conduit diameter.

#### **3.2 INSTALLATION OF CEMA 3R EXTERIOR CABINET**

- .1 Assemble equipment into the cabinet.
- .2 Mount the cabinet on the structure.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CSA C22.1-F15, Canadian Electrical Code, Part 1, 23<sup>rd</sup> Edition.
  - .2 CSA C22.2 No.40 (R2009), Short Circuit, Junction and pull Boxes.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures.*

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - *Common Product Requirements.*
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal.*

**Part 2 Products**

**2.1 CONDUIT BOXES**

- .1 Hot-dipped galvanized steel cast boxes, GUA Series, green factory-painted, for surface wiring of devices with 2, 3, or 4 threaded outlets.

**2.2 FITTINGS - GENERAL**

- .1 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.
- .2 Green baked polyester powder, interior and exterior coated.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges, or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.
- .4 Vacuum clean interior of outlet boxes before installation of wiring devices.

- .5 Identify systems for outlet boxes as required.

**END OF SECTION**

**Part 1        General**

**1.1            RELATED REQUIREMENTS**

- .1        Section 26 05 00 - *Common Work Results for Electrical.*

**1.2            REFERENCE STANDARDS**

- .1        CSA Group (CSA).
  - .1        CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
  - .2        CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
  - .3        CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
  - .4        CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
  - .5        CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
  - .6        CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

**1.3            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2        Product Data: Submit manufacturer's printed product literature, specifications and datasheets.
  - .1        Submit cable manufacturing data.

**1.4            QUALITY INSURANCE**

- .1        Test Report: Submit the testing reports delivered by independent and well-known laboratories.
- .2        Certification: Submit the signed documents from the manufacturer, certifying that the products and materials satisfy the required physical characteristics and performance criteria.
- .3        Instructions: Submit installation instructions supplied by the manufacturer.

**1.5            WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal.*
- .2        Place materials defined as hazardous or toxic waste in designated containers.
- .3        Ensure emptied containers are sealed and stored safely for disposal away from children.

**1.6 GENERAL**

- .1 All the conduits, tubes, and their paths are not necessarily on the drawings. Those that are present are represented schematically.
- .2 All conduits, boxes, and accessories are factory-painted with green baked polyester powder, inside and outside the conduit.

**Part 2 Products**

**2.1 CONDUITS**

- .1 Rigid Metal Conduit: To CSA C22.2 No. 45, hot-dipped galvanized steel threaded with epoxy coated, inside and outside, of baked green polyester powder.
- .2 Flexible Metal Conduit: To CSA C22.2 No. 56, liquid-tight flexible metal, maximum length of 600 mm.
- .3 Conduits and tubes to have a minimal nominal diameter of 21 mm, unless noted otherwise.

**2.2 CONDUIT FASTENINGS**

- .1 One-hole galvanized steel straps to secure surface conduits 50 mm and smaller.
  - .1 Two-hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 "U"-Channel type supports for two or more conduits at 1.5-m intervals.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.
- .5 Metallic fasteners only. Plastic fasteners are strictly prohibited.

**2.3 CONDUIT FITTINGS**

- .1 Fittings: To CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: Same as conduit.
- .2 Ensure factory "ells" where 90° bends for 25 mm and larger conduits.
- .3 Threaded connectors.

**2.4 EXPANSION FITTINGS FOR RIGID CONDUIT**

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100-mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.
- .4 The flexible conduit shall not be used as an expansion joint.

## 2.5 FISH CORD

- .1 Polypropylene, length in accordance to each conduit and to exceed each conduit by 3 m.

## Part 3 Execution

### 3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### 3.2 INSTALLATION

- .1 Install conduits to cause minimum interference in spaces through which they pass.
- .2 For the exterior, use rigid galvanized steel threaded epoxy coated conduit.
- .3 Minimum conduit size for lighting and power circuits: 21 mm.
- .4 Bend conduit cold:
  - .1 Replace conduit if kinked or flattened more than  $\frac{1}{10}$ <sup>th</sup> of its original diameter.
- .5 Mechanically bend steel conduit over 21 mm diameter.
- .6 Field threads on rigid conduit must be of enough length to draw conduits up tight.
- .7 Install fish cord in empty conduits.
- .8 Use firestop paste around ducts passing through fire separations.
- .9 Dry conduits out before installing wire.
- .10 Install an expansion joint on all conduits every 20 m.

### 3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to structure lines.
- .2 Run conduits in flanged portion of structural steel, if required.
- .3 Group conduits wherever possible on suspended or surface channels.
- .4 Do not pass conduits through structural members, except as indicated.

### 3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - *Cleaning*.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*

**1.2 REFERENCE STANDARDS**

- .1 Insulated Cable Engineers Association, Inc. (ICEA).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature, and data sheets for cables, and include product characteristics, performance criteria, physical size, finish, and limitations.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect cables from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - *Waste Management and Disposal.*

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.



**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for cable installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

**3.2 CABLE INSTALLATION IN DUCTS**

- .1 Install cables in ducts as indicated.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .5 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.
- .6 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .7 After installation of cables, seal duct ends with duct sealing compound.

**3.3 FIELD QUALITY CONTROL**

- .1 Perform tests in accordance with Section 26 05 00 - *Common Work Results for Electrical*.
- .2 Perform tests using qualified personnel.
  - .1 Include necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds.
  - .1 Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests:
  - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1,000 V megger on each phase conductor.
  - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Provide Government Representative with list of test results showing location at which each test was made, circuit tested, and result of each test.
- .7 Remove and replace entire length of cable if cable fails to meet any of test criteria.

**3.4 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.5 PROTECTION**

- .1 Repair damage to adjacent materials caused by cables installation.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*
- .2 Section 26 50 00 - *Lighting.*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CSA C22.1-15, Canadian Electrical Code, Part 1 (23<sup>rd</sup> Edition), Safety Standard for Electrical Installations.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature, and data sheets for photoelectric devices, and include product characteristics, performance criteria, physical size, finish, and limitations.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, in dry location, and in accordance with manufacturer's recommendations.
  - .2 Store and protect photoelectric devices from nicks, scratches, and blemishes.
  - .3 Protect metal accessories and trim from being bent or damaged.
  - .4 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse as specified in Section 01 74 19 - *Waste Management and Disposal.*

**Part 2 Products**

**2.1 PHOTOELECTRIC LIGHTING CONTROL**

- .1 Photoelectric Lighting Controls: To CSA C22.1.
  - .1 Mounted locking receptacle.
  - .2 Capable of commanding a lighting contactor.

- .3 Voltage variation:  $\pm 10\%$ .
- .4 Temperature range:  $- 40^{\circ}\text{C}$  to  $+ 70^{\circ}\text{C}$ .
- .5 Rated for 5,000 operations.
- .6 Delayed start-up.
- .7 Wall-mounting bracket.
- .8 Switching time delay of 30 s.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for lighting control device installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.2 INSTALLATION**

- .1 Install photoelectric controls in accordance with manufacturer's written instructions and to CSA C22.1.

#### **3.3 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

#### **3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by lighting control devices installation.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical*
- .2 Section 26 28 16.02 - *Moulded Case Circuit Breakers*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CSA C22.2 No.29-11, Panelboards and Enclosed Panelboards.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature, and data sheets for panelboards, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
  - .2 Include on drawings:
    - .1 Electrical detail of panel, branch breaker type, quantity, ampacity, and enclosure dimension.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - *Closeout Submittals*.
- .2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for panelboards for incorporation into O&M Manual.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, indoors, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect panelboard from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - *Waste Management and Disposal*.

## **Part 2 Products**

### **2.1 PANELBOARDS**

- .1 Panelboards: To CSA C22.2 No.29 and product of one manufacturer.
  - .1 Install circuit breakers in panelboards before shipment.
  - .2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- .2 250-V panelboards: Bus and breakers rated for 22 kA (symmetrical) minimally for the 250-V panelboards, unless otherwise indicated.
- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .4 Panelboards: Mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .5 Minimum of two flush locks for each panelboard.
- .6 Two keys for each panelboard and key panelboards alike.
- .7 Copper bus with neutral of same ampere rating of mains.
- .8 Mains: Suitable for bolt-on breakers.
- .9 Trim with concealed front bolts and hinges.
- .10 Trim and door finish, grey color baked enamel, type to be "door-in-door" to ease maintenance.
- .11 Ground bus.
- .12 Where the word "Espace" (Space) is used to denominate a circuit, no breaker should be installed, in addition of a removable cover plate. The word "Libre" (Vacant) means to supply and install a breaker.

### **2.2 BREAKERS**

- .1 Breakers: to Section 26 28 16.02 - *Moulded Case Circuit Breakers*.
- .2 Breakers with thermal and magnetic tripping in panelboards, except indicated otherwise.
- .3 Main Breaker: Separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.
- .4 Lock-on devices for fire alarm, life safety lighting, door supervision, intercom, stairway lighting, and exit lighting circuits.
  - .1 Additional locking devices: Ten for each circuit breaker rating, to be provided to the Government Representative.

### **2.3 EQUIPMENT IDENTIFICATION**

- .1 Provide equipment identification in accordance with Section 26 05 00 - *Common Work Results for Electrical*.
- .2 Nameplate for each panelboard, size 4 engraved as indicated.
- .3 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for panelboards installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 INSTALLATION**

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Connect loads to circuits.
- .3 Connect neutral conductors to common neutral bus with respective neutral identified.

### **3.3 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by panelboard installations.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1            Section 26 05 00 - *Common Work Results for Electrical.*

**1.2                REFERENCE STANDARDS**

- .1            CSA Group (CSA).
  - .1            CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.
  - .2            CAN/CSA C22.2 No.42.1-F00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national Standard, with UL 514D).
  - .3            CSA C22.2 No.55-FM1986(R2008), Special Use Switches.
  - .4            CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national Standard, with UL 20).

**1.3                ACTION AND INFORMATIONAL SUBMITTALS**

- .1            Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2            Product Data:
  - .1            Submit manufacturer's instructions, printed product literature, and data sheets for wiring devices, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3            Shop Drawings:
  - .1            Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
    - .1            Indicate on drawings:
      - .1            The details surrounding the integration in the architectural elements.

**1.4                CLOSEOUT SUBMITTALS**

- .1            Submit in accordance with Section 01 78 00 - *Closeout Submittals.*
- .2            Operation and Maintenance Data: Submit operation and maintenance(O&M) data for wiring devices for incorporation into O&M Manual.

**1.5                DELIVERY, STORAGE, AND HANDLING**

- .1            Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2            Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.



- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wiring devices from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - *Waste Management and Disposal*.

## **Part 2 Products**

### **2.1 RECEPTACLES**

- .1 Duplex receptacles of specified "Industrial" grade type, CSA type 5-15 R, 125 V, 15 A, "U" ground, with following features:
  - .1 Ivory urea moulded housing;
  - .2 Suitable for No. 10 AWG for back and side wiring;
  - .3 Break-off links for use as split receptacles;
  - .4 Eight back wired entrances, four side wiring screws;
  - .5 Triple wipe contacts and rivetted grounding contacts.
- .2 Single outlet receptacles for maintenance, specified "Industrial" quality allowing 15 and 20 A inputs, type CSA 5-20R, 125 V, 20 A.
- .3 Single outlet receptacles, twist-lock, specified "Industrial" quality, type CSA L5-20R, 125 V, 20 A.
- .4 Other outlets designed for allowable tension and ampacity: according to indications on drawings.
- .5 Hospital grade GFI, 15-20 A, 120 V receptacle.
- .6 Receptacles of one manufacturer throughout project.

### **2.2 COVER PLATES**

- .1 Stainless steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .2 All the cover plates must originate from a single and same manufacturer.
- .3 Stainless steel cover plates must be installed according to the specifications for the secured areas, mounted in built-in pull boxes.
- .4 Cast cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
- .5 Weatherproof during use, double lift spring-loaded cast aluminum cover plates, complete with gaskets for outdoor-rated duplex receptacles, as indicated.
- .6 All installations must be provided by a single manufacturer.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wiring devices installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

**3.2 INSTALLATION**

- .1 Receptacles:
  - .1 Install receptacles as indicated.
- .2 Cover Plates:
  - .1 Install suitable common cover plates where wiring devices are grouped.
  - .2 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

**3.3 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.4 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Protect stainless-steel cover plate finish with paper or plastic film until painting and other work is finished.
- .3 Repair damage to adjacent materials caused by wiring device installation.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CSA C22.2 No.106-05(R2010), HRC-Miscellaneous Fuses.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Provide fuse performance data characteristics for each fuse type and size above 200 A. The supplied characteristics should also include the average fusion time at a given current.
- .3 Shop Drawings:
  - .1 Provide shop drawings in accordance with Section 01 33 00 - *Submittal Procedures.*
  - .2 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Ship fuses in original containers.
- .2 Do not ship fuses installed in switchboard.
- .3 Store fuses in original containers in storage cabinet.
- .4 Waste Management and Disposal:
  - .1 Separate waste materials in accordance with Section 01 74 19 - *Waste Management and Disposal.*

**1.5 EXTRA MATERIALS**

- .1 Provide maintenance materials in accordance with Section 01 78 00 - *Closeout Submittals.*
- .2 Three spare fuses of each type and size installed above 600 A.
- .3 Six spare fuses of each type and size installed up to and including 600 A.

**Part 2 Products**

**2.1 FUSES - GENERAL**

- .1 Fuse type references L1, L2, J1, R1, etc., have been adopted for use in this Specification.

- .2 Fuses: Product of one manufacturer.

## **2.2 FUSE TYPES**

- .1 Class L fuses, 200 kA interruption capacity.
  - .1 Type L1: Time delay, capable of carrying 500% of its rated current for 10 s minimum.
  - .2 Type L2: Fast acting.
- .2 Class J fuses, 200 kA interruption capacity.
  - .1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Install fuses in mounting devices immediately before energizing circuit.
- .2 Ensure correct fuses fitted to physically matched mounting devices.
- .3 Ensure correct fuses fitted to assigned electrical circuit.
- .4 Install spare fuses in fuse storage cabinet.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*
- .2 Section 26 24 16.01 - *Panelboards Breaker Type.*
- .3 Section 26 28 20 - *Ground Fault Circuit Interrupters - Class A.*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national Standard with UL 489, and NMX-J-266-ANCE-2010).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature, and data sheets for circuit breakers, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Include time-current characteristic curves for breakers with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage and with an allowable ampacity of 200 A and more.
- .4 Certificates:
  - .1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit three copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet Standards and Regulations.
    - .1 Production certificate of origin must be submitted to Government Representative for approval.
  - .2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.
  - .3 Any work of manufacturing, assembly, or installation to begin only after acceptance of production certificate of origin by Government Representative. Unless complying with this requirement, Government Representative reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.
  - .4 Production certificate of origin must contain the following information:
    - .1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate;

- .2 Licensed dealer's name and address and person of distributor responsible for Contractor's account;
- .3 Contractor's name and address, as well as person responsible for project;
- .4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate;
- .5 Name and address of building where circuit breakers will be installed:
  - .1 Project title.
  - .2 End user's reference number.
  - .3 List of circuit breakers.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store circuit breakers in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect circuit breaker from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse as specified in Section 01 74 19 - *Waste Management and Disposal*.

### **Part 2 Products**

#### **2.1 GENERAL REQUIREMENTS**

- .1 Moulded-case circuit breakers, circuit breakers, accessory high-fault protectors and ground-fault circuit-interrupters: To CSA C22.2 No. 5. Rated 22 kA.
- .2 Bolt-on Moulded Case Circuit Breaker: Quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient. Rated 22 kA.
- .3 Common-trip Breakers: With single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
  - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers to have minimally the same current interruption capacity as the panel it is installed in.

## **2.2 THERMAL MAGNETIC BREAKERS (DESIGN A)**

- .1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short-circuit protection.

## **2.3 MAGNETIC BREAKERS (DESIGN B)**

- .1 Moulded case circuit breaker to operate automatically by means of magnetic tripping devices to provide instantaneous tripping for short-circuit protection.

## **2.4 ADDITIONAL FEATURES**

- .1 Include:
  - .1 "On-Off" locking device for each breaker.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### **3.2 INSTALLATION**

- .1 Install circuit breakers as indicated.

### **3.3 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*
- .2 Section 26 24 16.01 - *Panelboard Breaker Type.*
- .3 Section 26 28 16.02 - *Moulded Case Circuit Breakers.*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CAN/CSA C22.2 No.144-M91(R2006), Ground Fault Circuit Interrupters.
- .2 National Electrical Manufacturers Association (NEMA).
  - .1 NEMA PG 2.2-1999(R2009), Application Guide for Ground Fault Protection Devices for Equipment.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature, and data sheets for ground fault circuit interrupters, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
- .4 Test and Evaluation Reports: Submit test report for field testing of ground fault equipment to Government Representative and certificate that system as installed meets criteria specified.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - *Closeout Submittals.*
- .2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for ground fault circuit interrupters for incorporation into O&M Manual.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.



- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect ground fault circuit interrupters from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - *Waste Management and Disposal*.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Equipment and components for ground fault circuit interrupters (GFCI): To CAN/CSA C22.2 No.144.
- .2 Components comprising ground fault protective system to be of same manufacturer.

### **2.2 BREAKER TYPE GROUND FAULT INTERRUPTER**

- .1 Two-pole ground fault circuit interrupter for 15 A or 20 A, 120 V, single-phase, with testing and reset devices, as indicated.
  - .1 Transition device to detect ground faults, Class A.
  - .2 Rated 22 Ka.

### **2.3 GROUND FAULT PROTECTOR UNIT**

- .1 Self-contained with 15 A or 20 A, 120 V circuit interrupter and duplex or single receptacle complete with:
  - .1 Solid state ground sensing device.
  - .2 Facility for testing and reset.
  - .3 CSA Enclosure 1, surface-mounted with steel face plate.

## **Part 3 Execution**

### **3.1 EXAMINATION**

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for ground fault circuit interrupters installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

### 3.2 INSTALLATION

- .1 Do not ground neutral on load side of ground fault relay.
- .2 Pass phase conductors, including neutral, through zero sequence transformers.
- .3 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

### 3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - *Common Work Results for Electrical* and co-ordinate with Section 01 45 00 - *Quality Control*, if required.
- .2 Arrange for field testing of ground fault equipment by the Contractor before commissioning service.
- .3 Demonstrate simulated ground fault tests.

### 3.4 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste material in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - *Common Work Results for Electrical.*

**1.2 REFERENCE STANDARDS**

- .1 CSA Group (CSA).
  - .1 CSA C22.2 No.14-10, Industrial Control Equipment.
- .2 National Electrical Manufacturers Association (NEMA).
  - .1 NEMA ICS 2-2000 (R2005), Controllers, Contactors and Overload Relays Rated 600 V.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature, and data sheets for contactors, and include product characteristics, performance criteria, physical size, finish, and limitations.

**1.4 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - *Closeout Submittals.*
- .2 Operation and Maintenance Data: Submit operation and maintenance data for contactors for incorporation into manual.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect contactors from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - *Waste Management and Disposal.*

**Part 2 Products**

**2.1 CONTACTORS**

- .1 Contactors: To CSA C22.2 No.14.
- .2 Electrically held controlled by pilot devices as indicated and rated for type of load controlled.
- .3 Mount in NEMA 1 enclosure, unless otherwise indicated.
- .4 Include following options in cover:
  - .1 Red LED indicating lamp (pilot lamp) for the presence of voltage;
  - .2 Green LED indicating lamp (pilot lamp) for the running;
  - .3 "Manual-Off-Auto" rotative selector switch.
- .5 Control Transformer: Installed in the contactor's enclosure, command voltage as indicated on drawing (secondary voltage).
- .6 Unless otherwise indicated, the contactors shall be equipped of two N.O. contacts and two N.C. contacts.

**2.2 EQUIPMENT IDENTIFICATION**

- .1 Identify equipment in accordance with Section 26 05 00 - *Common Work Results for Electrical*.
- .2 Size 4 nameplate indicating name of load controlled.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Install contactors and connect power wires and auxiliary control devices.
- .2 Identify contactors with nameplates or labels indicating panel and circuit number.
- .3 Test contactors in accordance with 26 05 00 - *Common Work Results for Electrical*.

**3.2 CLEANING**

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion remove surplus materials, rubbish, tools, and equipment, in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: Separate waste materials in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**3.3 PROTECTION**

- .1 Protect installed products and components from damage during construction.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 26 05 00 - Common Work Results for Electrical.

**1.2 REFERENCE STANDARDS**

- .1 American National Standards Institute (ANSI).
  - .1 ANSI C82.1-04, Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
  - .2 ANSI C82.4-02(R2007), Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps Multi Supply Type.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE).
  - .1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- .3 ASTM International Inc.
  - .1 ASTM F1137-00(2006), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4 CSA Group (CSA).
- .5 ICES-005-07, Radio Frequency Lighting Devices.
- .6 Underwriters Laboratories of Canada (ULC).

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 -Submittal Procedures.
- .2 Product Data:
  - .1 Provide manufacturer's printed product literature, specifications, and data sheet, and include product characteristics, performance criteria, physical size, finish, and limitations.
  - .2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for approval by Departmental Representative.
  - .3 Photometric data to include: VCP Table where applicable.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

**Part 2 Products**

**2.1 TYPE C LAMP POST**

- .1 General.
  - .1 The streetlights are designed to meet the requirements of the Canadian Highway Bridge Calculation Code CAN/CSA-S6. The calculations must be provided as well as the workshop drawings of the poles and stems, and must be signed and sealed by a member engineer in good standing of the Order of Engineers of Quebec.
- .2 Product.
  - .1 Steel pole.
    - .1 Pole: Is made of a tube of 4 in. (102 mm) round in high-tensile steel, having a wall of 0.250 in. (6.4 mm) thick, welded to the upper and lower part of the anchor base.
    - .2 Access door: The pole is equipped with an opening of 2 in. x 4½ in. (51 mm x 114 mm) whose centre is 20 in. (508 mm) of the bottom of the anchor base, complete with a sealed aluminum door and a copper grounding terminal. The pole is equipped with a second opening of 2 in. x 4½ in. (51 mm x 114 mm) at 0° of the standard access door, complete with an aluminum watertight door, allowing access to the wire mill.
    - .3 Base cover: Molded aluminum 356 round shape in two sections, mechanically assembled using stainless-steel screws.
    - .4 Hardware: All accessible fasteners from the outside will be stainless steel and will be coated with a ceramic sealer to reduce the attachment of parts. All gaskets and gaskets are ethylene propylene EPDM and/or silicone.
    - .5 Finish: Black textured color (BKTX). Application of thermosetting polyester paint (4 mils/100 microns). The chemical compounds constituting the thermosetting resins must provide resistance to ultraviolet and saline mist according to ASTM Standard-B117-73 and be impervious to moisture according to ASTM-D2247-68.
  - .2 Lighting fixture.
    - .1 Description of the components:
      - .1 Roof: Made of injection-molded 360.1 aluminum and mechanically assembled to the heatsink.
      - .2 Cage: Round-shaped, the cage is equipped with four arms with a single-piece molded technical ring in aluminum 360.1 per injection and is mechanically assembled on the sleeve.
      - .3 Sleeve: Aluminum A 360.1 injection molded, the sleeve is equipped with a watertight door giving access to the regulator and a connector block that is used with bare wires (max. 2 gauge) in the primary. Sealing factor IP66. Complete with easy-to-install self-adjusting system with 2 ³⁄₈ pressure screws-16 Unc. Adapts to a post of 4 in. (102 mm) outside diameter x 4 in. (102 mm) of length.

- .4 Lens: Tempered sodocalcite glass, assembled and mechanically sealed to the upper technical ring.
- .5 Lighting system: Type ES, 120 lumens per watt. Composed of 16 high-performance white LEDs, the wattage of the lamp is 20 W. colour temperature 4000 ° K nominal, 70 IRC. Based on the LM80 results, at the end of their lifespan, 50% maintain more than 70% (L70) of their initial luminous flux. Aluminum-based printed circuit used to ensure a better heat transfer and extended the life of the lighting system. The LED platform contains a connector for easy replacement.
- .6 Optical system: (LE2), I.E.S., type II (asymmetric). Equipped with high-performance acrylic lenses optimized by the variation of beam angles in order to achieve maximum spacing, the targeted lumens give a perfect uniformity. The optical system offers an IP66 class sealing protection rating. Photometric performance is certified by an independent laboratory using the standard LM63, LM79 and TM15 (IESNA). On the upper technical ring a marker indicates the street side. Meets the requirements of the starry sky with 0% of light pointing upwards.
- .7 Regulator: High-power factor of 95%. Electronic regulator, frequency between 50-60 Hz. Automatically adjusts to a voltage between 120 and 277 VAC, class I, TDH of up to 20%. Maximum operating ambient temperature of -40°F (-40°C) up to 130°F (55°C). Certified according to ULC Standards. Sealing factor IP66. Assembled on a turntable and equipped with a Tyco-type plug-in to withstand a temperature of 221°F (105°C).  
  
The regulator will reduce the current power sent to the LEDs if the regulator temperature exceeds 176°F (80°C) protecting the LEDs and electrical components.  
  
Equipped with output protection on the circuit, on voltage, current overload, automatic recovery after correction.
- .8 Closing system: An injection-molded 360.1 aluminum technical ring with a hinged latch. The mechanism provides tool-free access to the lamp. A silicone seal with a shape memory helps to ensure the sealing. Sealing factor IP66.
- .9 Electrical components comply with the RoHS. 40°C (104°F) temperature maximum operating ambient.
- .10 Heatsink: Molded aluminum to optimize the efficiency and the life of the LEDs. No moving part cooling system is used.
- .11 Surge protection: Protector 10 K3-pole V for led regulator that protects phase to ground, mass to neutral and ground neutral in accordance with IEEE Guidelines / ANSI C 62.41.2.



- .3 Finishing.
  - .1 The color of the lighting fixtures must be black textured (BKTX) and applied to the baked polyester powder.
  - .2 The painting process of lighting fixtures should include the following steps:
    - .1 Soap wash heated to 100-120°F;
    - .2 Rinsing with a conditioner at room temperature;
    - .3 Vaporization with zinc phosphate heated to 100-200°F;
    - .4 Rinsing with water at room temperature;
    - .5 Application by spraying a non-chemical sealer, at approximately 90-100°F;
    - .6 Drying;
    - .7 Application by vaporization of polyester powder (electrostatic system);
    - .8 Baking in a convection oven at 500°F.
    - .9 The polyester powder coating must have a minimum thickness of 100 microns (4 thousandths of an inch) electrostatically deposited on all surfaces.
    - .10 The paint coating must meet the requirements of the moisture resistance standards:
      - .1 1 000 hours of exposure according to ASTM-B2247.  
  
and the standards of resistance to ultraviolet rays and saline mist:
      - .2 2 500 hours of exposure according to ASTM-B117.
    - .11 The manufacturer shall provide the certifications demonstrating that his process meets the above-mentioned Standards.
- .4 Material.
  - .1 Lamp post C type:
    - .1 Lighting fixture:
      - .1 Model: Philips MPTC-55W32LED4K-G2-LE4-120/277-AST-RC-SP2-PH9-BKTK or approved equivalent product by Departmental Representative.
    - .2 Pole:
      - .1 Model: Philips SPR4V-14-G-BKTX or approved equivalent product by Departmental Representative.

## 2.2 TYPE A AND D LIGHTING FIXTURES

- .1 General.
  - .1 The streetlights are designed to meet the requirements of the Canadian Highway Bridge Calculation Code CAN/CSA-S6. The calculations must be provided as well as the workshop drawings of the poles and stems, and must be signed and

sealed by a member engineer in good standing of the Order of Engineers of Quebec.

.2 Products.

.1 Console.

- .1 Arm: Must be made of construction steel and fitted with an anchor plate and an HSS steel tube with a post. The anchor plate has four holes for its installation on the structure.

.3 Lighting Fixtures.

- .1 The housing is A360 injection molded aluminum 0.090 in. (2.4 mm) minimum thickness. The housing accepts a post with a diameter ranging from 1.66 in. (42 mm) to 2<sup>3</sup>/<sub>8</sub> in. (60 mm) by 6 in. (152 mm) in length. The fastening device includes a reversible zinc-plated mounting bracket, retained by 4 bolts <sup>3</sup>/<sub>8</sub>-16 UNC. The mounting bracket is pre-assembled for a 2<sup>3</sup>/<sub>8</sub> in. (60 mm) diameter post. For use on a post de 1.66 in. (42 mm) or 1.9 in. (48 mm) diameter. The mounting bracket must be reversed by others. A molded part in the housing allows an adjustment to ± 5° for ease of maintenance and installation. The enclosure is complete including a secure door preventing it from accidentally falling into the opening and allowing tool-free access to electronic components and a connector block used with bare wires (max. 2 gauge) in the primary. A 13-in. (330 mm) rear clearance is required to remove the door.
- .2 Lighting system: LEDgine composed of four main components:
- .1 Heatsink.
- .2 LED lamp.
- .3 Optical system.
- .4 Regulator.
- .3 Electrical components comply with RoHS. Maximum operating ambient temperature of 40°C (104°F).
- .4 Heatsink: Molded aluminum to optimize the efficiency and the life of the LEDs. No moving part cooling system is used.
- .5 Lamp: LED module (included), Philips Lumileds LUXEON R LED type, composed of 160 high performance white LEDs. Colour temperature 4,000 K nominal, 70 IRC. Operating lifetime based on TM extrapolation-21 to obtain the results after which 50% of the LEDs maintain more than 70% (L70) of their initial luminous flux. Aluminum-based printed circuit used to ensure better heat transfer and extend the life of the lighting system.
- .6 Optical system: IES type. Equipped with optimized high-performance polymer lenses to achieve maximum spacing, the targeted lumens provide perfect uniformity. The optical system offers an IP66 Class sealing protection rating. Photometric performance is certified by an independent laboratory using the LM Standard-63, LM-79 and TM-15 (IESNA). Street side indicated. Meets the requirements of the starry sky with 0% light pointing upwards and "U0" according to IESNA TM-15.
- .7 Regulator: High power factor of 95%. Electronic regulator, frequency between 50/60 Hz. Automatically adjusts to a voltage between 120 and 277 VAC, Class II, TDH of up to 20%. Maximum operating ambient temperature of -40°F

- (-40°C) up to 130°F (55°C). Certified to ULC UL1310 Standards. For wet and dry place. Assembled on a turntable and equipped with a Tyco-type slip plug that is resistant to a temperature of 221°F (105°C). The regulator is compatible for dimmer 0-10 V.
- .8 The regulator must reduce the current power sent to the LEDs, if the temperature of the regulator undergoes an internal overheating protecting the LEDs and the electrical components. Equipped with a short output protection-circuit, surge, current overload, automatic recovery after correction. Includes a 2.5 kV (min) built-in surge protector.
  - .9 Surge protection: Built-in surge protector tested in accordance with ANSI/IEEE C 62.45 ANSI/IEEE c 62.41.2 Scenario I, Category C, high exposure of combined 10 kV/10 kA waveforms for combination line-ground, line-neutral and neutral-ground, and complying with the requirements of US DOE (Department of energy) MSSLC Specification Model (Municipal Solid-State Street Lighting Consortium) for road luminaires for the requirements of electrical immunities for high-level tests 10 kV/10 kA.
  - .10 Sleeve: In injection molded aluminum 360.1, the sleeve is equipped with a watertight door giving access to the regulator and a connector block that is used with bare wires (max. 2 gauge) in the primary. Sealing factor IP66. With an easy-to-install self-adjusting system with two <sup>3</sup>/<sub>8</sub> pressure screws-16 UNC. Fits on 4 in. (102 mm) outside diameter x 4 in. (102 mm) long.
  - .11 Manufacturing standards for LED products: Electronic components sensitive to electrostatic discharge (ESD) such as light-emitting diodes (LEDs) are assembled in accordance with the Standards IEC61340-5-1 and ANSI/ESD S 20.20 to eliminate the events of the risk of decreasing the useful life of the product.
  - .12 Vibration resistance: The floor lamp meets the vibration requirements of the ANSI C 136.31 Standard, American National Standard for a Bridge/Viaduct Application (Tested by an independent laboratory for 3G with 100,000 cycles).
- .4 Finishing.
- .1 Finished: Color with black textured finish (BKTX) and complies with AAMA 2603 Standard. Application of a thermosetting polyester paint (4 mils/100 microns) with a tolerance of ± 1 mils/24 microns. Thermosetting resins provide fading resistance according to ASTM D2244, gloss retention according to ASTM D523, and is impervious to moisture according to ASTM D2247.
  - .2 The surface treatment achieves a minimum of 2,000 hours for the resistance to saline mist and the tests are carried out according to the ASTM Standard- B117.
- .5 Material.
- .1 Type A - Lighting fixture:
    - .1 Lighting fixture: Philips, Model RVS-55W32LED4K-G2-LE3-UNV-AST-SP2-RC-PH9-BK or approved equivalent product by Departmental Representative.
    - .2 Console: Specifically made.

- .2 Type D - Lighting fixture:
  - .1 Lighting fixture: Philips, Model RVS-55W32LED4K-G2-LE4-UNV-AST-SP2-RC-PH9-BK or approved equivalent product by Departmental Representative.
  - .2 Console: Specifically made.
- .6 Execution.
  - .1 Installation.
    - .1 Erection of lighting fixtures:
    - .2 After receiving the approval of the Departmental Representative, the Contractor can install the luminaires and consoles, perfectly cleaned beforehand. The anchor bolts and nuts must be coated with a fibrous grease and tightened thoroughly so as not to leave any play.

### 2.3 LIGHTING FIXTURES - TYPES B, E, AND F

- .1 Description.
  - .1 These projectors are a high-output, exterior-rated LED lighting luminaires designed for accent and site lighting. Architectural and Landscape versions deliver high-quality white light output in 2700 K, 3000 K, 3500 K, and 4000 K to support a range of uplighting, floodlighting, and decorative lighting applications.
  - .2 Expands customization with a wide range of new accessory options. In addition to the native 6° lens, six (6) different spread lenses can customize the luminaire to produce 10°, 20°, 40°, 60°, 80°, and 10° x 40° (asymmetric) beam angles. Four (4) housing color choices (black, gray, white, and bronze) - plus the option to add a louver, full glare shield, and half glare shield.
  - .3 Complies with ASTM B117 corrosion resistance standard for > 1,500 hours and ANSI C136.31-2010 Standard with a 3G vibration rating.
  - .4 Integrates patented technology that controls power output to luminaires directly from line voltage - rapidly, efficiently, and accurately. The data enabler control merges line voltage with control data and delivers them to luminaires over a single standard cable, dramatically simplifying installation, and lowering total system cost.
  - .5 Improves durability with new flat lens that prevents water from pooling into the luminaire, keeping the LEDs protected and secure over the course of a luminaire's lifetime.
  - .6 Universal power input range of 100 to 277 VAC.
  - .7 Precision Dimming - Smooth dimming down to 1% with optional Data controller and digital control interface. Optional ELV dimming versions available as custom configurations.
  - .8 Works seamlessly with a full range of controllers, including Light System Manager, Video System Manager, Video System Manager Pro, iPlayer 3, Antumbra Color Keypad, and ColorDial Pro - as well as third-party controllers.

.2 Specification.

.1 Output.

<b>Colour Temp.</b>	4,000 K	4,000 K	4,000 K
<b>Beam Angle</b>	10°	20°	40°
<b>Lumens</b>	1,847	1,812	1,782
<b>Efficiency (lm/W)</b>	65.4	64.4	63.4
<b>CRI</b>	82	82	82

.2 Electrical.

- .1 Input Voltage: 100 to 277 VAC, auto-ranging, 50/60 Hz Power Consumption 30 W (Maximum at full output, steady state)
- .2 Power Factor:> 0.9 at 100 to 240 VAC; > 0.85 at 277 VAC.

.3 Control.

- .1 Dimmer:
  - .1 "ON/OFF", precision dimming by four (4) conductor cables and Data Enabler Pro, Remote Monitoring and Management, ActiveSite Ready, works with Interact Landmark.

.4 Lumen Maintenance.

<b>Threshold</b>	<b>Ambient Temperature</b>	<b>Reported</b>	<b>Calculated</b>
L90	25°C	28,000	28,000
	50°C	27,000	27,000
L70	25°C	51,000	84,000
	50°C	51,000	83,000
L50	25°C	51,000	> 100,000
	50°C	51,000	> 100,000

.5 Physical.

- .1 Dimensions: 287 x 210 x 186 mm (11.3 x 8.3 x 7.3 in.) (height x width x depth).
- .2 Weight: 5.5 kg (12.1 lbs).
- .3 Effective Projected Area (EPA): 0.026 m<sup>2</sup> (0.28 ft<sup>2</sup>).
- .4 Luminaire plus Full Glare Shield.
- .5 Housing Material: Die-cast aluminium, powder-coated finish, lens clear tempered glass.
- .6 Luminaire Connections: 1.8 m (6 ft) unified power/data cable.

.6 Temperature Ranges.

- .1 -40 to 50 °C (-40 to 122°F) / Operating.
- .2 -20 to 50 °C (-4 to 122°F) / Startup.
- .3 -40 to 80 °C (-40 to 176°F) / Storage.

.7 Vibration Resistance.

- .1 Complies with ANSI C136.31, 3G.
- .2 Mechanical Impact: IK08.

- .8 Corrosion Resistance.
  - .1 Complies with ASTM B117 Standard for > 1,500 hours.
  - .2 Humidity: 0 to 95%, non-condensing.
- .9 Certification and Safety.
  - .1 Approbation: UL/cUL, FCC Class A, CE, PSE, CQC, RCM.
  - .2 Certification: DLC.
  - .3 Environment: Dry/Damp/Wet Location, IP66.
- .10 Manufacturer.
  - .1 Lighting fixtures.
    - .1 Type B:
      - .1 Luminaire:
        - .1 Color Kinetics, eW Burst PowerCore gen2, 4,000 K, Black housing, Architectural.
        - .2 Spec No.: 523-000098-16.
        - .3 10° spread lens: 120-000189-18.
        - .4 Trim ring, black: 120-000189-21.
        - .5 Wiring box: 106-000011-30.
        - .6 Power supply: 106-000004-00.
        - .7 Support: Custom made.
        - .8 Or approved equivalent product by Departmental Representative
      - .2 Type E:
        - .1 Luminaire:
          - .1 Color Kinetics, eW Burst PowerCore gen2, 4,000 K, Black housing, Architectural.
          - .2 Spec No.: 523-000098-16.
          - .3 10° spread lens: 120-000189-12.
          - .4 Trim ring, black: 120-000189-21.
          - .5 Wiring box: 106-000011-30.
          - .6 Power supply: 106-000004-00.
          - .7 Support: Custom made.
          - .8 Or approved equivalent product by Departmental Representative
        - .3 Type F:
          - .1 Luminaire:
            - .1 Color Kinetics, eW Burst PowerCore gen2, 4,000 K, Black housing, Architectural.
            - .2 Spec No.: 523-000098-16.
            - .3 10° Spread Lens: 120-000189-13.
            - .4 Trim Ring, black: 120-000189-21.
            - .5 Wiring box: 106-000011-30.

- .6 Power supply: 106-000004-00.
- .7 Support: Custom made.
- .8 Or approved equivalent product by  
Departmental Representative

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Locate and install the lamp posts and lighting fixtures as indicated.

**3.2 WIRING**

- .1 Connect the equipment to electrical and control circuits:
  - .1 Install wiring in rigid conduit.

**3.3 CLEANING**

- .1 Clean and remove surplus materials, excess materials, rubbish, tools, and equipment.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        Section 32 12 16 – *Bituminous Pavement Covering*
- .2        Section 32 16 00 – *Curbs, gutters and sidewalks*

**1.2                REFERENCE STANDARDS**

- .1        Bureau de normalisation du Québec (BNQ)
  - .1        NQ 2560-114, latest edition    *Travaux de génie civil – Granulats*
  - .2        NQ 2560-600, latest edition    *Granulats – Matériaux recyclés fabriqués à partir de résidus de béton, d'enrobés bitumineux et de briques – Classification et caractéristiques*

**1.3                SAMPLES**

- .1        Submit samples in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2        Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

**1.4                TRANSPORTATION, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 00 - *Common Product Requirements*.
- .2        Transportation and Handling: Transport and handle aggregates to prevent segregation, contamination and degradation.
- .3        Storage: Store washed or excavated material under water for at least 24 hours to allow free water to flow and to level the water content in these materials.

**1.5                WASTE MANAGEMENT AND DISPOSAL**

- .1        Divert unused granular materials from landfill to local facility as approved by Government Representative.



## Part 2 Products

### 2.1 MATERIALS

- .1 Foundation material MG20 and MG20b must have the following particle size:

Screen	MG20 % pass	MG20b % pass	MG-112 % pass
31,5 mm	100	100	100
20 mm	90 -100	90 -100	
14 mm	68 – 93	68 – 93	
5 mm	35 -55	35 -60	12-100
1,25 mm	17 – 38	19 – 38	
315 µm	8 – 17	9 – 17	
80 µm	2,0 – 5	5,0 – 11	0-10

- .2 The material for the sub-foundation is type MG 56 and must conform to norm NQ2560-114, Part II – *Fondation, Sous-fondation, Couche de roulement et Accotements*.
- .3 The material CG 14 and type BC 80 µm – 5 must conform to the specifications of norm NQ2560-114, Part III - *Coussin, Enrobage, couche anticontaminante et couche filtrante*.
- .4 The gravel for normal concrete must conform to the specifications of norm NQ2560-114, Part IV: *Béton de masse volumétrique normale*.
- .5 The gravel for hot asphalt must conform to the specifications of norm NQ2560-114, Part V – *Enrobés à chaud*.

### 2.2 SOURCE QUALITY CONTROL

- .1 An attestation of conformity must be submitted to the Government Representative for each reserve of crushed gravel.

## Part 3 Execution

### 3.1 PREPARATION

- .1 Handling
- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.

- .2 Stockpiling
  - .1 Stockpile aggregates on site in locations as indicated, unless directed otherwise by the Government Representative. Do not stockpile on completed pavement surfaces.
  - .2 Stockpile aggregates in sufficient quantities to meet project schedules.
  - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
  - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
  - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
  - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 hrs of rejection.
  - .7 Stockpile material in 1.5 m high piles, forming uniform layers.
  - .8 Do not cone piles or spill material over edges of piles.
  - .9 Do not use conveying stackers.

### 3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .4 Leave any unused aggregates in neat compact stockpiles as directed by Government Representative.
- .5 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
- .6 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 32 12 16 – *Bituminous Pavement Covering*.
- .2 Section 32 17 23 – *Pavement Marking*.

**1.2 MEASUREMENT AND PAYMENT**

- .1 No measurement for payment will be made under this Section.
- .2 Measure cleaning pavement surfaces by lump sum.
- .3 Measure removal of pavement markings in metres of solid lines or painted length of broken lines effectively removed.

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for each type of abrasives and solvent used on project.
  - .2 Submit two (2) copies of WHMIS SDS in accordance with Section 01 35 43 - *Environmental Procedures* and 01 35 29.06 - *Health and Safety Requirements*.

**1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - *Common Product Requirements* with manufacturer's written instructions.
- .2 Develop Waste Management and Disposal Plan related to Work of this Section.
- .3 Packaging Waste Management: remove for reuse by manufacturer and return of packaging materials, pallets, padding, crates, as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - *Waste Management and Disposal*.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Abrasives and solvents used for removal of paint, oil, grease, rubber deposits: proprietary products specially designed for pavement cleaning, subject to approval by Government Representative.

**Part 3 Execution**

**3.1 REMOVING PAVEMENT MARKINGS**

- .1 Remove rubber tire deposits and paint markings, in areas as directed by Government Representative, by water jet stripping, rotary grinding, heater planning or other method approved in writing by Government Representative.
- .2 Exercise care to avoid dislodging of coarse aggregate particles, excessive removal of fines, damage to bituminous binder or damage to joint and crack sealers.
- .3 Do not heat pavement surfaces above 120°C, when using heater planning equipment.

**3.2 PAVEMENT SURFACE CLEANING**

- .1 Remove dust, contaminants, loose and foreign materials, oil and grease, in areas as directed by and by method approved in writing by Government Representative.
- .2 Use rotary power brooms supplemented by hand brooming.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.

**END OF SECTION**

## **Part 1 General**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 07 13 52 *Modified bituminous sheet waterproofing*
- .2 Section 31 05 16 *Aggregates for earthwork*

### **1.2 MEASUREMENT AND PAYMENT**

- .1 Refer to section 01 29 00 – *Payment procedures*
- .2 The following works are not subject to any measuring for payment purposes. The price must be included in the asphalt paving price.
  - .1 Asphalt tack coat.
  - .2 Connections or links to the existing road.

### **1.3 REFERENCE STANDARDS**

- .1 Ministère des transports du Québec:
  - .1 Cahiers des Normes, Ouvrages routiers, Tome V « Signalisation routière »
  - .2 Cahiers des Normes, Ouvrages routiers, Tome VII « Matériaux »
    - .1 Norme 4101 - Bitumes.
    - .2 Norme 4105 - Émulsions de bitume.
    - .3 Norme 4201 - Enrobés à chaud formulés selon le principe de la méthode Marshall.
    - .4 Norme 4202 - Enrobés à chaud formulés selon la méthode de formulation du Laboratoire de chaussées.
    - .5 Norme 14601 – Pellicules rétroréfléchissantes.
  - .3 LC 26-500 - « Détermination du facteur de correction à utiliser pour déterminer la masse volumique in situ des enrobés à l'aide d'un nucléodensimètre »
  - .4 LC 26-510 - « Détermination de la masse volumique in situ des enrobés à l'aide d'un nucléodensimètre »
  - .5 LC 26–600 - « Mesure des irrégularités et des dépressions d'une chaussée »
  - .6 Cahier des charges et devis généraux du MTQ - Infrastructures routières, Construction et réparation (édition 2019)

### **1.4 DEFINITIONS**

- .1 Bituminous mix: Mixture of aggregates and asphalt prepared hot in an asphalt batching plant and intended for hot application.
- .2 Internal quality control: Quality control performed by the contractor responsible for supplying the asphalt mixes.
- .3 External quality control: Quality control performed by an organization independent of the contractor.

- .4 Monitoring of internal controls: Monitoring of the contractor's internal control results via external control.
- .5 Process audits: Within the context of a specific project, documented verification of the asphalt mix production process, application of the quality management activities described in the contractor's quality manual, and in the quality plan and control and testing plan.
- .6 ISO 9002 registration: Standard that defines the minimum requirements of a quality system.
- .7 The asphalt performance class is defined by the term PG H L where:
  - .1 PG: Performance Grade;
  - .2 H: represents the temperature limit (in °C) above which the asphalt is likely to exhibit irreversible deformation phenomena;
  - .3 L: represents the temperature limit (in °C) below which the asphalt is likely to crack by thermal shrinkage.
- .8 An asphalt batch is defined in standard 4101.
  - .1 A batch means production of the same type of mix by the same plant, intended for a specific project of the Government Representative under the same contract.

## 1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Submit bituminous mix design and trial mix test results to Government Representative for approval at least 2 weeks prior to beginning work.
  - .1 The theoretical bituminous mix formula must be dated and signed by the manufacturer's quality control representative.
  - .2 A theoretical formula by type of bituminous mix must be produced for each type of binder or each change in the sources of supply of aggregates. The characteristics presented in this formula must be representative of the asphalt mix that will be applied and must comply with the requirements of standard 4202.
    - .1 If the control production results comply with to the requirements of these specifications, the final formula will be accepted as submitted or with slight modifications.
- .3 The bitumen must comply with the specifications of standard 4101. The bitumen will be sampled at the plant before the beginning of the work.
- .4 Submit viscosity-temperature chart for bituminous cement to be supplied showing either Saybolt Furol viscosity in seconds or Kinematic Viscosity in centistokes, temperature range 105 to 175 degrees C at least 4 weeks prior to beginning Work.
- .5 Submit manufacturer's test data and certification that bituminous cement meets requirements of this section.
- .6 Two (2) weeks before the beginning of the work, provide a reflector disk sample for roadway pre-marking.

## 1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section with manufacturer s written instructions and section 01 61 00 - *Common Product Requirements*.

## Part 2 Products

### 2.1 MATERIALS

- .1 Bitumen
  - .1 Specifications
    - .1 The requirements regarding bitumen characteristics and evaluation criteria are set in standard 4101.
    - .2 The performance class to be used is PG 64E-28 for bituminous mix of surface coat and PG 64H-28 for bituminous mix of base layers.
  - .2 Quality assurance
    - .1 All bitumen used in asphalt mix production must be produced by a Manufacturer holding a quality system registration conforming to ISO 9002 (Quality System – Model for Quality Assurance in Production, Installation and Servicing).
    - .2 For each asphalt delivery, the bituminous mix manufacturer must obtain a certificate of compliance from the bitumen manufacturer containing the following information:
      - .1 General information:
        - .1 Identification of the manufacturer and the production site;
        - .2 Bitumen performance class;
        - .3 Bitumen lot number;
        - .4 Production date.
      - .2 Characterization tests:
        - .1 Bitumen characterization date;
        - .2 All the tests in Table 4101-1 of standard 4101.
      - .3 Control tests:
        - .1 Control date;
        - .2 All the controls in Table 4101-1 of standard 4101.
  - .3 Working temperatures
    - .1 Minimum and maximum mixing temperatures:
      - .1 A range of 14 degrees Celsius is allocated for mixing. This interval is determined by applying a tolerance of  $\pm 7$  degrees Celsius on the optimum mixing temperature corresponding to a viscosity of 0.17 Pa-s.
      - .2 This temperature is determined according to test method LC 25-007.

- .3 In the event that this calculation results in a maximum mixing temperature greater than 170°C, this maximum temperature is set at 170°C and the minimum temperature is set at 156° C.
- .2 Bitumen tack coats
  - .1 The specifications regarding the bitumen tack coat product are prescribed in Standard 4105 of Ministère des Transports du Québec.
- .3 Aggregates
  - .1 For bituminous mixes formulated according to the “Laboratoire des chaussées” formulation method, the aggregate must also satisfy the requirements of standard 4202.
  - .2 The granularity, the intrinsic characteristics and production of fine aggregates and coarse aggregates, and the complementary characteristics must satisfy standard 4202 and are established in the following table:

ROADWAY TYPE	COUCHE	AGGREGATE SIZE	CHARACTERISTICS	
			Intrinsic grade	Production grade
Local traffic	Surface coat	Coarse	2	b
		Fine	1	
	Base coat	Coarse	3	c
		Fine	2	

- .4 Bituminous mixes
  - .1 The following bituminous mix types will be used for the performance of this project:
    - .1 ESG-10, PG 64E-28 – Surface coat
    - .2 ESG-14, PG 64H-28 – Base coat
    - .3 Thickness indicated in the plan.
  - .2 The bituminous mixes must be produced according to standard 4202.
    - .1 The bituminous mixes must be produced by a company operating an asphalt batching plant holding a registration certificate issued by a registrar accredited by the Standards Council of Canada or by a recognized accreditation body, depending on whether it has a quality



system conforming to ISO 9002 “Quality System – Model for Quality Assurance in Production, Installation and Servicing”.

- .3 Recovered bituminous pavement and coarse and fine aggregates containing clinker and/or blast furnace residues must not be used in any bituminous mix.
- .4 Conformity
  - .1 The conformity or nonconformity decision will apply to a complete batch.
  - .2 The work is subdivided into batches of 1,000 tonnes each. The work for which the quantities involved are smaller than those of a batch are considered to form a batch.
  - .3 For work involving more than one batch, the quantities in tonnes, exceeding one batch or an exact number of batches, are considered to form a batch if they are equal to or greater than 100 tonnes; otherwise, they are considered to be part of the last complete batch.
  - .4 The bituminous mix will be sampled in situ at a frequency of one sample per 200 tonnes of bituminous mix according to test method LC 26-005 and the conformity tests will be at the Manufacturer’s expense.
  - .5 In addition to meeting the requirements of these specifications, a batch is considered to conform by external control if, for the main characteristics, the deviation between the mean result obtained on the samples taken in this batch and the formula falls within the tolerable deviations ( $E_t$ ) indicated in the following table:

Main characteristic	TOLERABLE AND CRITICAL DEVIATIONS FROM THE FORMULA				
	$E_t$ for N = 1	$E_t$ for N = 2	$E_t$ for N = 3	$E_t$ for N = 4	$E_t$ for N = 5
% passing through the 80 $\mu$ m sieve	1.7	1.2	1.0	0.9	0.8
<u>Granulometric total</u>					
ESG-10	30	22	18	16	14
ESG-14	40	30	24	21	19
<u>Bitumen content</u>					
ESG-10 and ESG-14	0.45	0.38	0.31	0.27	0.24
<u>Pavement compaction</u>					
ESG-10 and ESG-14	4.0	1.6	1.4	1.3	1.0

\* N = Number of samples

Note 1 For compaction, the tolerable and critical deviations are applied to

the minimum requirement of 93%.

Note 2 The tolerable and critical deviations apply to the mean value of the batch in relation to the mix formula.

Note 3 The value of the deviations indicated is expressed as a percentage.

.5 Percentage of voids

- .1 A batch will be considered to conform if the percentage of voids in the batch established according to standard LC 26-320 deviates less than 1.5% from the final bituminous mix formula.

.6 Other characteristics

- .1 For bituminous mix formulated according the Laboratory's formulation method (standard 4202) to conform:

- .1 The percentage passing the results of the analysis on the first sieve on which any retention is permitted must not be more than 3% lower than the minimum requirement indicated in Table 4202-1 of standard 4202, and the requirement of 100% passing through the next sieve up must be met, as stipulated in the same table;

- .2 The percentage (%) of voids indicated in Table 4202-1 of standard 4202, on the gyratory shear press for each number of gyrations must be targeted or obtained.

- .3 In the event that one of these criteria is not met, each sample which resulted in nonconformity with these criteria must be analyzed individually in relation to the requirements mentioned in Table 4201-1 of standard 4201, in order to evaluate the prejudice, and the Government Representative reserves the right to reject the work and to have it redone by the contractor.

- .4 Any bituminous mix produced which does not satisfy the requirements stipulated in the plans and specifications must be considered defective.

- .2 Control of acceptance of pavement compaction and thickness.

- .1 The compaction of bituminous pavements must be verified with a nucleodensimeter. This clause does not apply to bituminous mixes used for patching or correction before laying the pavement.

- .2 Nucleodensimeter calibration

- .1 For any asphalt batching plant, the nucleodensimeter used is calibrated according to the procedure defined in ASTM D 2950, 2009, "Standard test method for density or bituminous concrete in place by nuclear methods" or according to a concordance of nucleodensimeter tests versus core sample densities, produced at least once a year, by bituminous mix type over an average of samples to establish a correction of the density obtained with the device used.

- .7 Proportioning of mixing formula
  - .1 The proportioning of mixing formula must be provided to the Government Representative for approval.
  - .2 The mixing formula cannot be changed without the Government Representative's approval. If the source of supply changes, a new mixing formula must be approved by the Government Representative.

## 2.2 EQUIPMENT

- .1 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Rollers: sufficient number of type and weight to obtain specified density of compacted mix.
- .3 Vibratory rollers:
  - .1 Drum diameter: 1200 mm minimum.
  - .2 Amplitude of vibration (machine setting): 0.5 mm maximum for lifts less than 40 mm thick.
  - .3 Vibrations are forbidden on the bridge.
- .4 Haul trucks: sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
  - .1 Boxes with tight metal bottoms.
  - .2 Covers of sufficient size and weight to completely cover and protect bituminous mix when truck fully loaded.
  - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
  - .4 Use only trucks which can be weighed in single operation on scales supplied.
- .5 Hand tools:
  - .1 Lutes or rakes with covered teeth for spreading and finishing operations.
  - .2 Tamping irons having mass 12 kg minimum and bearing area not exceeding 310 cm<sup>2</sup> for compacting material along curbs, gutters and other structures inaccessible to roller. Mechanical compaction equipment, when approved by Government Representative, may be used instead of tamping irons.
  - .3 Straight edges, 4.5 m in length, to test finished surface.
- .6 Plant testing facility: provide laboratory space at plant site for exclusive use of Government Representative, for performing tests, keeping records and making reports.

## Part 3 Execution

### 3.1 GENERAL

- .1 No surface mix must be placed after October 24<sup>th</sup> until the restart of work in a subsequent year, without written permission of the Government Representative.

- .2 At spring, the bituminous pavements must be produced after a thaw period, when the water coming from snowmelt on the ground is completely drained from the soil.
- .3 The bituminous mixes must be prepared and placed under favourable weather conditions at an ambient temperature allowing production of a flexible pavement conforming to the requirements of these specifications.
- .4 It is forbidden to operate when the mixture of the aggregates affects the mix temperature or the speed of operations or when the base is soaked or covered with puddles or mud.
- .5 The temperature of the surface to be covered must be at least 5°C with a rising trend. When the surface temperature falls below 5°C, no surface course must be placed without written permission from the Government Representative.
- .6 At all times, the mix must be compacted under it reaches the specified density.
- .7 At all times, the contractor must take the necessary measures to minimize the dust emissions that may be caused by its work.
- .8 The storage temperature of the bitumen and mixing in the plant must be less than or equal to the maximum temperatures indicated in the bitumen's certificate of conformity.

### **3.2 ALIGNMENTS AND LEVELS**

- .1 All the work must be performed in accordance with the alignments and levels indicated in the plans and details.
- .2 Except where otherwise indicated, the final surface repair elevations must be the same as the elevations indicated in the plans.
- .3 If obstructions or other fortuitous circumstances not anticipated in the plans hinder the work to the extent of necessitating changes, the Government Representative may require that the work be modified or moved accordingly.

### **3.3 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt paving in accordance with manufacturer s written instructions.
  - .1 Visually inspect substrate in presence of Government Representative.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Government Representative.

### **3.4 PREPARATION**

- .1 When paving over existing bituminous mix pavement surface, clean pavement surface.
- .2 When levelling course is not required, patch and correct depressions and other irregularities to approval of Government Representative before beginning paving operations.
- .3 Apply a tack coat, prior to paving.

- .4 Prior to laying mix, clean surfaces of loose and foreign material.

### **3.5 TRANSPORTATION OF MIX**

- .1 Transport mix to job site in vehicles cleaned of foreign material.
- .2 Paint or spray truck beds with limewater, soap or detergent solution, or nonpetroleum based commercial product, at least daily or as required.
  - .1 Elevate truck bed and thoroughly drain. No excess solution to remain in truck bed.
- .3 Unless the Government Representative allows artificial lighting for installation at night, schedule the delivery so that the materials are installed in daylight.
- .4 Deposit the mixture coming from intermediate hoppers or from storage in small quantities only, in order to limit the segregation of materials.
  - .1 For the same reason, avoid dropping materials from too high a height.
- .5 Deliver material to paver at uniform rate and in an amount within capacity of paving and compacting equipment.
- .6 Ensure materials are delivered continuously in covered vehicles, then spread and compacted immediately. During delivery and installation, the temperature of the mixture must be within the limits determined by the Departmental Representative, but it must never be lower than 135 degrees Celsius. It is never allowed to overheat a mixture to counterbalance the cooling caused by the journey, whatever the length.
  - .1 The decrease in temperature of the asphalt mixes between mixing and the time of placing in situ must not exceed 15°C.
  - .2 Any mix not satisfying these requirements will be rejected.

### **3.6 PLACEMENT OF BITUMINOUS MIX**

- .1 Obtain Government Representative's approval of base and existing surface and the tack coat prior to placing asphalt.
- .2 Traffic must be authorized on the freshly placed pavement only when the pavement temperature has cooled to below 50°C.
- .3 Place bituminous concrete to thicknesses, grades and lines as indicated.
- .4 Placing conditions:
  - .1 Place bituminous mixes only when air temperature is 5°C minimum.
  - .2 When temperature of surface on which material is to be placed falls below 10°C, provide extra rollers as necessary to obtain required compaction before cooling.
  - .3 Do not place bituminous mixes when pools of standing water exist on surface to be paved, during rain, or when surface is damp.
- .5 Spread and strike off mixture with self-propelled mechanical finisher.
  - .1 The self-propelled mechanical spreader must be driven by a competent operator.

- .2 The adjustments to the grader, the tampers, the distribution screws, etc. must be verified regularly so that the texture of the mix is uniform, free of tears, deformations or grooves.
- .3 The operating mode (stopping time, speed, etc.) of a mechanical spreader must allow production of a pavement with conforming density and characteristics.
- .4 When a single spreader is used, the mix must be placed over a length not exceeding 200 m in hot weather and 50 m in cold weather. The Government Representative may allow derogation from this rule and prescribe a more appropriate sequence, taking into account the thickness of the mix, the temperatures and the hourly production of the asphalt batching plant.
- .5 When using pavers in echelon, have first paver follow marks or lines, and second paver follow edge of material placed by first paver. Work pavers as close together as possible and in no case permit them to be more than 30 m apart.
- .6 Maintain constant head of mix in auger chamber of paver during placing.
- .7 If segregation occurs, immediately suspend spreading operation until cause is determined and corrected.
- .8 Correct irregularities in alignment left by paver by trimming directly behind machine.
- .9 Correct irregularities in surface of pavement course directly behind paver. Remove by shovel or lute excess material forming high spots. Fill and smooth indented areas with hot mix. Do not broadcast material over such areas.
- .10 It is forbidden to spread materials on the surfaces to be repaired.
- .11 Do not spread surplus material on surfaces which have just been compacted.
- .6 In places difficult to reach with the mechanical spreader, the mixture is spread manually.
  - .1 Use approved wood or steel forms, rigidly supported to assure correct grade and cross section. Use measuring blocks and intermediate strips to aid in obtaining required cross-section.
  - .2 The mixture is distributed evenly and spread in a loose layer of uniform density using rakes or hoes, taking care to avoid segregation.
  - .3 Before rolling, check the surface with the ruler and correct the inequalities.
  - .4 The circumference of the frames and covers and the hard to reach places must be compacted with hot iron.
  - .5 It is prohibited to spread materials by throwing.
- .7 On traffic lanes, aprons and parking areas, start spreading on the highest side of the pavement or from the pavement crown, and ensure that the initial strip overlaps the pavement axis of convex roads.
- .8 When hand tools are cleaned with fire, care should be taken not to bring them to temperatures high enough to burn the mixture. When hand tools are cleaned with oil, place the oil container in a place where the mixture can not be contaminated.
- .9 Any asphalt pavement that does not meet the specifications must be rejected and must be re-done at the expense of the Contractor, including the removal and disposal of defective materials and all incidental expenses.

### 3.7 COMPACTING

#### .1 General:

- .1 The bituminous mix pavement layers must be between 92% and 98% of that obtained according to standard LC 26-320. Continue compaction until the mixture has reached the requested density.
- .2 All the bituminous mix pavement layers that do not conform to the minimum requirement of 93.0% of the maximum density after final compaction must be considered nonconforming and must be removed and redone by the contractor at its own expense, until the desired results are obtained.
- .3 Use static compaction for levelling layers less than 25 mm thick.
- .4 For lifts 50 mm thick and greater, adjust speed and vibration frequency of vibratory rollers to produce minimum of 25 impacts per meter of travel. For layers less than 50 mm thick, the spacing between the various groomed points must not be greater than the thickness of the layer, after compaction.
- .5 Start rolling operations as soon as placed mix can bear weight of roller without excess displacement of material or cracking of surface.  
The minimum number of rollers must be two (2), including at least one pneumatic-tired roller. However, the real number necessary must be the number that allows a bituminous mix pavement to be obtained with a driving surface and density that conform to the specifications. The Government Representative may authorize the use of one road roller for small area.
- .6 Operate breakdown rolling slowly to avoid displacement of material.
- .7 Operate roller and not exceed 5 km/h for breakdown and intermediate rolling for static steel-wheeled and pneumatic tired rollers. Do not exceed 9 km/h for finish rolling.
- .8 Overlap successive passes of roller by minimum of 200 mm and vary pass lengths.
- .9 Keep wheels of roller slightly moistened with water to prevent pick-up of material but do not over-water.
- .10 Do not stop vibratory rollers on pavement that is being compacted with vibratory mechanism operating.
- .11 Do not permit heavy equipment or rollers to stand on finished surface before it has been compacted and has thoroughly cooled.
- .12 After traverse and longitudinal joints and outside edge have been compacted, start rolling longitudinally at low side and progress to high side. Ensure that all points across width of pavement receive essentially equal numbers of passes of compactors.
- .13 When paving in echelon, leave unrolled 50 to 75 mm of edge which second paver is following and roll when joint between lanes is rolled.
- .14 Where rolling causes displacement of material, loosen affected areas at once with lutes or shovels and restore to original grade of loose material before re-rolling.
- .15 Rolling must be completed before sundown. The Government Representative may accept derogation from this rule if he considers that satisfactory precautions are taken.



- .16 It is forbidden to compact by vibration or oscillation on the bridge slab and inside 2m limit from the abutment or a retaining wall
- .2 Breakdown rolling:
  - .1 Begin breakdown rolling with vibratory roller immediately following rolling of transverse and longitudinal joint and edges.
  - .2 Operate rollers as close to paver as necessary to obtain adequate density without causing undue displacement.
  - .3 Operate breakdown roller with drive roll or wheel nearest finishing machine. When working on steep slopes or super-elevated sections use operation approved by Government Representative.
  - .4 Use only experienced roller operators.
- .3 Intermediate rolling:
  - .1 Use pneumatic-tired, steel wheel or vibratory rollers and follow breakdown rolling as closely as possible and while paving mix temperature allows maximum density from this operation.
  - .2 Rolling to be continuous after initial rolling until mix placed has been thoroughly compacted.
- .4 Finish rolling:
  - .1 Accomplish finish rolling with two-axle or three-axle tandem steel wheeled rollers while material is still warm enough for removal of roller marks. If necessary, to obtain desired surface finish, use pneumatic-tired rollers as directed by Government Representative.
  - .2 Execute the rolling work in successive stages and coordinate them precisely.
- .5 Acceptance
  - .1 If the average batch compaction value falls below the requirement, a re-evaluation of compaction by means of core samples will be performed as described in the following clause.
    - .1 The Government Representative sets a date for re-evaluation of compaction by means of one (1) core sample for each 200 tonnes of bituminous mix placed.
    - .2 The location of the core samples is determined at random. The core samples must be taken within 20 days after sending the notice to the contractor.
    - .3 The percentage of compaction of the pavement is the ratio of the gross density of the core sample to the average maximum density for the day found during control of receiving, multiplied by 100.
    - .4 The gross density tests of the core samples are performed in the laboratory mandated by the Corporation according to test method LC 26-040.
    - .5 The contractor may delegate an observer during sampling and performance of the tests. Any comment on a procedure considered to be



defective must be provided on the spot, and any case of divergence must be brought to the attention of the Government Representative.

- .6 The costs inherent in this re-evaluation are at the contractor's expense.

### 3.8 JOINTS

#### .1 General:

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
- .2 Construct joints between bituminous mixes pavement and Portland cement concrete pavement as indicated.
- .3 Impregnate contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.

#### .2 Transverse joints:

- .1 Offset transverse joint in succeeding lifts by at least 600 mm.
- .2 Cut back to full depth vertical face and tack face with thin coat of hot bitumen prior to continuing paving.
- .3 If milling is necessary to rework a joint, this operation must be performed at the contractor's expense.
- .4 Compact transverse joints to provide smooth riding surface. Use methods to prevent rounding of compacted surface at joints.

#### .3 Longitudinal joints:

- .1 Offset longitudinal joints in succeeding lifts by at least 150 mm.
- .2 Cold joint is defined as joint where asphalt mix is placed, compacted and left to cool below 100°C prior to paving of adjacent lane.
  - .1 If cold joint can not be avoided, cut back by saw cutting previously laid lane, by at least 150 mm, to full depth vertical face, and tack face with thin coat of hot asphalt of adjacent lane.
- .3 Overlap previously laid strip with spreader by 25 to 50 mm.
- .4 Before rolling, carefully remove and discard coarse aggregate in material overlapping joint with lute or rake.
- .5 Roll longitudinal joints directly behind paving operation.
- .6 When rolling with static or vibratory rollers, have most of drum width ride on newly placed lane with remaining 150 mm extending onto previously placed and compacted lane.
- .7 Place the mix at the end of the day so as not to leave any longitudinal joints to be completed the next day.

- .4 Make thinned joints in the locations indicated so that their thinnest part is made with materials composed of fine aggregates, by modifying the composition of the mixture or by removing the large aggregates contained in the mixture with a lutes or rakes or a smoothing machine. Position and compact the material in order to obtain a smooth joint with no apparent drop.

- .5 Construct butt joints as indicated.

### 3.9 FINISH TOLERANCES

- .1 Finished bituminous mix pavement surface to be within 5 mm of design elevation but not uniformly high or low.
- .2 Finished bituminous mix pavement surface not to have irregularities exceeding 5 mm when checked with 4.5 m straight edge placed in any direction.
- .3 Cleaning of manholes, valve chambers, sumps, sidewalks and curbs.
  - .1 Immediately after placing a bituminous mix course, the contractor must clean the sewer manholes, the sumps and the valve chambers of all debris accumulated during the work or found at the beginning of the work. The covers must be cleaned, and the sidewalks must be free of bitumen burrs.

### 3.10 DEFECTIVE WORK

- .1 Correct irregularities which develop before completion of rolling by loosening surface mix and removing or adding material as required.
  - .1 If irregularities or defects remain after final compaction, remove surface course promptly and lay new material to form true and even surface and compact immediately to specified density.
- .2 Repair areas showing checking, rippling, or segregation.
- .3 Adjust roller operation and screed settings on paver to prevent further defects such as rippling and checking of pavement.

### 3.11 DAMAGE TO EXISTING WORKS

- .1 The Contractor must take all necessary precautions to protect the existing pavement. He is responsible for all damages and must complete, at its expense, all measures to repair.
  - .1 Existing pavement works:
    - .1 Straight saw cut the existing pavement
    - .2 Use a traction wheel loader to avoid any damage to the existing asphalt coat;
    - .3 The use of a caterpillar loader is prohibited at all time on the existing pavement.
  - .2 If the Contractor fails to comply with these requirements, the Government Representative may require the contractor to repair the asphalt coating on the entire width of the street, at its expense
- .2 The Contractor must take all necessary precautions to protect the existing sidewalks and curbs. He is responsible for all damages and must complete, at its expense, all measures to repair.

### 3.12 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 02 41 16 *Structure Demolition*
- .2 Section 03 10 00 *Concrete Forming*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast-in-place Concrete*
- .5 Section 03 30 03 *Concrete Repairs*
- .6 Section 31 05 16 *Aggregates for Earthwork*

**1.2 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM C117, latest edition, *Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.*
  - .2 ASTM C136/C136M, latest edition, *Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.*
  - .3 ASTM C 309, latest edition, *Liquid Membrane Forming Compounds for Curing Concrete.*
  - .4 ASTM D1751, *Standard Specification For Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).*
  - .5 ASTM D698-12e2, *Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).*
- .2 CSA Group
  - .1 CSA-A23.1/A23.2, latest edition, *Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete, Including Update No. 1 2015.*

**1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - *Submittal Procedures.*
- .2 Product Data:
  - .1 Submit WHMIS SDS in accordance with Section 01 35 29.06 – *Health and Safety Requirements.*
  - .2 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, and limitations.
- .3 Inform Government Representative of proposed source of materials and provide access for sampling minimum four (4) weeks prior to commencing work.
- .4 If materials have been tested by independent testing laboratory approved by Government Representative within previous two (2) months and have passed tests equal to requirements

of this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

##### **.1 Waste Management and Disposal:**

- .1 Separate waste materials for recycling or reuse in accordance with Section 01 74 19 - *Waste Management and Disposal*.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 03 – *Concrete Repairs*.
- .2 Reinforcing steel: in accordance with Section 03 20 00 - *Concrete Reinforcing*.
- .3 Curing Compound: in accordance with Section 03 30 03 – *Concrete Repairs*.
- .4 Granular base: material to Section 31 05 16 – *Aggregate for Earthwork*
- .5 Non-staining mineral type form release agent: chemically active release agents containing compounds reacting with free lime to provide water-soluble soap.
- .6 Fill material: to Section 31 05 16 – *Aggregate for Earthwork*
- .7 Curing Agent: to ASTM C309, Type 1.
- .8 Expansion Joint Filler: Premoulded bituminous fibre board, conforming to ASTM D1751.

### **Part 3 Execution**

#### **3.1 GRADE PREPARATION**

- .1 Do grade preparation work in accordance with indications on drawings.
- .2 Place fill in maximum 150 mm layers and compact to minimum 95 % of maximum dry density to ASTM D698.

#### **3.2 GRANULAR BASE**

- .1 Obtain Government Representative's approval of subgrade before placing granular base.
- .2 Spread the granular materials of the base layer respecting the lines, widths and depths indicated.
- .3 Compact the materials of the granular base layer into layers up to 150 mm thick, to at least 95% of the maximum density, according to standard ASTM D698.

#### **3.3 CONCRETE**

- .1 Obtain Government Representative's approval of granular base and reinforcing steel prior to placing concrete.
- .2 Do concrete work in accordance with Section 03 30 03 – *Concrete Repairs*.

- .3 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom side to side across sidewalk.
- .4 Provide edging as indicated with 10 mm radius edging tool.
- .5 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Government Representative can be demonstrated. Hand finish surfaces when directed by Government Representative.

### **3.4 TOLERANCES**

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

### **3.5 EXPANSION AND CONTRACTION JOINTS**

- .1 Install tooled transverse contraction joints after floating, when concrete stiff, but still plastic, at intervals as indicated on drawings.
- .2 Install expansion joints as indicated on drawings and by Government Representative.
- .3 When sidewalk adjacent to curb, make joints of curb, gutters and sidewalk coincide.

### **3.6 ISOLATION JOINTS**

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints as indicated on drawings.
- .3 Seal isolation joints with sealant approved by Government Representative.

### **3.7 TACTILE WALKING SURFACE INDICATORS**

- .1 Install tactile walking surface indicators at curb ramp edges, in accordance with local municipal by-laws.

### **3.8 CURING**

- .1 Cure concrete by adding moisture continuously in accordance with CSA-A23.1/A23.2 to exposed finished surfaces for minimum one (1) day after placing, or sealing moisture in by curing compound as directed by Government Representative.
- .2 Curing of unformed concrete surfaces: absorbent cloths soaked in water:
  - .1 Place water-saturated synthetic fiber fabrics on concrete surfaces sufficiently hardened so that it is not damaged on the surface by it, then cover with waterproof sheets to maintain humidity on the surface of the concrete;
  - .2 Overlap each strip a minimum of seventy-five (75) mm and secure against movement by wind;
  - .3 Keep absorbent sheets in place and keep them continuously wet so that there is a thin layer of water on the surface of the concrete for the duration of the cure, whether for seven (7) calendar days after concreting.
- .3 Cure of unformed concrete surfaces: Chemical cure:

- .1 Seal with curing agent as directed by Government Representative so that the mixture retains the moisture necessary for ripening.
- .2 Apply curing product evenly to form a continuous film, in accordance with manufacturer's requirements.
- .3 The curing material forming a membrane must be applied at the rate recommended by the manufacturer, without however being less than 0.2 l / m<sup>2</sup> on all concrete surfaces. The curing material must be shaken before application in order to obtain a uniform film over the entire surface.
- .4 Curing of formwork concrete surfaces:
  - .1 No additional cure is required if the formwork is left in place for seven (7) consecutive days or more;
  - .2 If the formwork is removed in less than seven (7) consecutive days, in accordance with section 03 10 00 – *Concrete Forming*, absorbent cloths soaked in water or a curing material forming a membrane must be applied immediately. on the stripped surfaces and kept in place for the rest of the period of seven (7) calendar days.
- .5 During the curing period, only uncover the areas necessary for the finishing treatment, recover and continue the cure.

### **3.9 BACKFILL**

- .1 Allow concrete to cure for seven (7) days prior to backfilling.
- .2 Backfill to designated elevations with material as directed by Government Representative.
  - .1 Compact and shape to required contours as indicated on drawings.

### **3.10 CLEANING**

- .1 Cleaning during work: carry out cleaning work in accordance with section 01 74 00 - *Cleaning*.
  - .1 Leave the premises clean at the end of each working day.
- .2 Final cleaning: remove surplus materials / materials, waste, tools and equipment from site in accordance with section 01 74 00 - *Cleaning*.
- .3 Waste management: sort waste for reuse / reuse and recycling, in accordance with section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove bins and recycling bins from site and dispose of materials at appropriate facilities.

**END OF SECTION**

**Part 1 General**

**1.1 RELATED REQUIREMENTS**

- .1 Section 32 01 11.01 – *Pavement Cleaning and Marking Removal*.

**1.2 MEASUREMENT AND PAYMENT**

- .1 Pavement marking measured metres of solid lines or painted length of dash lines, void excluded.

**1.3 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM E1360 90 (2000) e1, Standard Practice for Specifying Color by Using the Optical Society of America Uniform Color Scales System.
  - .2 ASTM D4797 88(2004) Standard Test Methods for Chemical and Gravimetric Analysis of White and Yellow Thermoplastic Traffic Marking Containing Lead Chromate and Titanium Dioxide.
- .2 Green Seal (GS)
  - .1 GS-11-Edition 3.2 (2015), Standard for Paints and Coatings.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Safety Data Sheets (SDS).
- .4 Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - current edition.
    - .1 MPI #32, Traffic Markings Paint, Alkyd.
    - .2 MPI #97, Latex Traffic Marking Paint.
- .5 South Coast Air Quality Management District (SCAQMD)
  - .1 SCAQMD Rule 1113-16, Architectural Coatings.
- .6 Cahier des charges et devis généraux, Infrastructures routières, Construction et réparation, Dernière édition, Gouvernement du Québec.
- .7 Ouvrages routiers, Normes, Tome VII – Matériaux, norme 10,2, *Produit de marquage*, Transports Québec.
- .8 Normes Ouvrages routiers, Tome V, Signalisation routière, Transports Québec.

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.



.2 Submit two (2) copies of WHMIS SDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.

.3 Samples:

.1 Submit to Government Representative following material sample quantities at least four (4) weeks prior to commencing work.

.1 Two 1 L samples of each type of paint.

.2 Sampling to MPI Painting Manual.

.2 Mark samples with name of project and its location, paint manufacturer's name and address, name of paint, MPI specification number and formulation number and batch number.

## 1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in dry location in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

## 1.6 SITE CONDITIONS

.1 Sustainable Design Provisions:

.1 Seasonal restriction for high VOC content traffic marking coatings.

.1 Traffic marking coating application between May 1st and October 15th subject to seasonal use restriction and have VOC concentration maximum 150 g/L.

## Part 2 Products

### 2.1 MATERIALS

1. The marking product

1. Two-component approved epoxyres, two parts resin and one catalyst, meet the requirements of Transport Quebec's 10202 standard.

2. The Entrepreneur must use the products listed in the most recent edition of the approval list of the Ministère des Transports du Québec.

1. Toner: supplied by a product recognized by the manufacturer of branding products.

2. Reflective glass microbeads: suitable for application on a freshly painted surface, designed to re-reflect road markings.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings acceptable for product installation in accordance with MPI instructions prior to pavement markings application.
  - .1 Visually inspect substrate in presence of Government Representative.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions rectified.

**3.2 EQUIPMENT REQUIREMENTS**

- .1 Paint applicator: approved pressure type mobile with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.
- .2 Distributor: capable of applying reflective glass beads as overlay on freshly applied paint.

**3.3 APPLICATION**

- .1 Unless otherwise approved by Government Representative, apply paint when air temperature minimum 10 degrees C, wind speed maximum 60 km/h and no rain forecast within next four (4) hours.
- .2 Apply traffic paint evenly at rate of 3 m<sup>2</sup>/L to form minimum 8 mil dry film thickness, in accordance with MPI Architectural Painting Specification Manual "Preparation of Surfaces" and "Application" for "Approved Product" listing.
- .3 Do not thin paint unless approved by Government Representative.
- .4 Symbols and letters to dimensions indicated.
- .5 Paint lines of uniform colour and density with sharp edges.
- .6 Thoroughly clean distributor tank before refilling with paint of different colour.

**3.4 TOLERANCE**

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.
- .2 Remove incorrect markings in accordance with Section 32 01 11.01 - *Pavement Cleaning and Marking Removal*.

**3.5 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.

- .1 Remove insulation material spilled during installation and leave work area ready for application of wall board.

### **3.6 PROTECTION**

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

**END OF SECTION**

## **Part 1        General**

### **1.1            RELATED REQUIREMENTS**

- .1        Not used.

### **1.2            REFERENCE STANDARDS**

- .1        American Association of State Highway and Transportation Officials (AASHTO)
  - .1        AASHTO M180-2000 (2004), Standard Specification for Corrugated Sheet Steel Beams for Highway Guardrails.
- .2        ASTM International
  - .1        ASTM A123/A123M-09, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - .2        ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
- .3        CSA Group (CSA)
  - .1        CAN/CSA O80 Series-08, Wood Preservation.
- .4        Forest Stewardship Council (FSC)
  - .1        FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
  - .2        FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1.
  - .3        FSC Accredited Certified Bodies.
- .5        Ministère des Transports du Québec
  - .1        Cahier des charges et devis généraux, Infrastructures routières, Construction et réparation, Dernière édition, Ministère des Transports du Québec.
  - .2        Normes Ouvrages routiers, Tome VII, Matériaux, Ministère des Transports du Québec
  - .3        Normes Ouvrages routiers, Tome VIII, Dispositifs de retenue, Ministère des Transports du Québec

### **1.3            DEFINITIONS**

- .1        Semi-rigid guardrail: W-Beam guide rail

### **1.4            ACTION AND INFORMATIONAL SUBMITTALS**

- .1        Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2        Product Data:
  - .1        Submit manufacturer's instructions, printed product literature and data sheets for guide rail, wood, and coatings and include product characteristics, performance criteria, physical size, finish and limitations.

- .3 Shop Drawings:
  - .1 Submit drawings stamped and signed by professional engineer registered to the Ordre des ingénieurs du Québec (OIQ).

## 1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - *Common Product Requirements* and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect guide rails from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## Part 2 Products

### 2.1 MATERIALS

- .1 Steel W-beam guide rail as indicated and as follows:
  - .1 Steel rail and terminal sections: in accordance with Standard 6301, Tome VII, Ministère des Transports du Québec.
  - .2 Bolts, nuts and washers: to ASTM A307, hot dip galvanized to ASTM A123/A123M.
- .2 Sawn timber posts and offset blocks:
  - .1 Species: hemlock, western hemlock, jack pine, red pine, Douglas-fir and yellow pine .
  - .2 Type: pressure treated in accordance with CAN/CSA-O80 Series.
  - .3 Grade: N°1.
  - .4 Dimensions: as indicated.

## Part 3 Execution

### 3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for guide rail installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Government Representative.
  - .2 Inform Government Representative of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed Government Representative.

### 3.2 ERECTION

- .1 Installation of posts:
  - .1 Set posts by instrument for alignment, and locations in accordance with Appendix I - *Glissières semi-rigides avec profilé à double ondulation sur poteaux de bois*, aligning them with surveying instruments.
  - .2 Excavate post holes to depths as indicated and to diameter of 360 mm (plus or minus 20 mm).
  - .3 Compact bottom to provide firm foundation.
  - .4 Set post plumb and square in hole.
  - .5 The Contractor must install the posts so that the tops of the posts follow a regular line. The vertical alignment of the posts must not reproduce the imperfections of the road and shoulders.
  - .6 Backfill around posts using excavated material and compact in uniform layers not exceeding 150 mm compacted thickness.
- .2 Installation of sliding elements and accessories:
  - .1 Install W-Beam guide rail in accordance with standard drawings in Appendix I - *Glissières semi-rigides avec profilé à double ondulation sur poteaux de bois*.
  - .2 In the case of sliding elements in double corrugated steel profile and accessories, the bolts must be tightened with a manual or other wrench, so as to obtain a tightening torque of at least 100 N • m, without, however, deforming the elements to be assembled.
  - .3 For fixing sliding elements in double corrugated steel profile on wooden posts, the bolts must be tightened completely using a jaw wrench with a length of about 400 mm, without, however, deforming the elements to be assembled.
  - .4 Bolts must not protrude more than 12 mm from the nut.

### 3.3 PROTECTION

- .1 Protect equipment and installed components from damage during construction.
- .2 Damaged surfaces whose width is less than or equal to 2.5 cm must be repaired by applying, with a brush, two coats of a zinc rich coating with a minimum content of 87% metallic zinc in the dry film. In addition, on the same part, the total surface to be repaired with a zinc-rich coating must be less than or equal to 0.5% of its total surface.
- .3 Damaged surfaces must be cleaned beforehand according to the requirements of standard SSPC - SP 11 "Power Tool Cleaning to Bare Metal". The minimum total thickness of the dry coating film must be 130 µm.
- .4 Parts whose damaged surfaces have a width greater than 2.5 cm or total more than 0.5% of the total surface of the part must be replaced or re-galvanized.
- .5 Repair damage to adjacent materials and equipment due to installation of rails, at Contractor's expense.

**3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.
- .3 Waste Management: separate waste materials for reuse/recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**APPENDIX I**

*W-Beam guide rail on wooden posts*



Transports,  
Mobilité durable  
et Électrification  
des transports

Québec

NORME

DESSIN NORMALISÉ

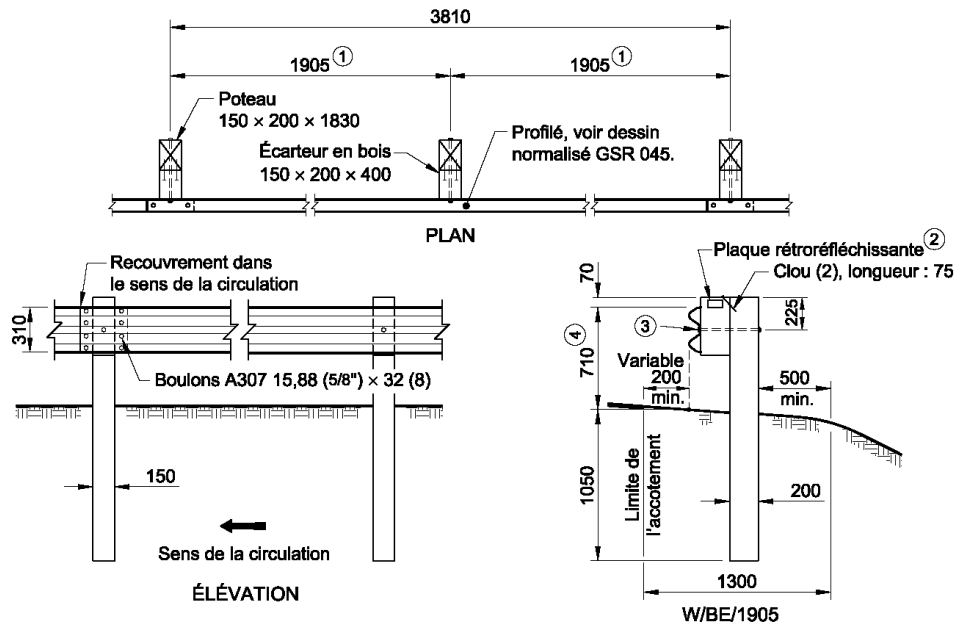
GLISSIÈRE SEMI-RIGIDE  
AVEC PROFILÉ D'ACIER  
À DOUBLE ONDULATION  
SUR POTEAUX DE BOIS

Tome  
VIII

Chapitre  
3

Numéro  
GSR 001

Date  
2018 10 30



①	Espacement des poteaux (mm)	1905	952
	Déformation dynamique (mm)	900	600

- ② Sur tous les deux poteaux, une plaque rétro réfléchissante de 50 x 100 mm doit être posée. La pellicule auto-adhésive est fixée sur un support d'aluminium dont le dos est peint. Elle est maintenue à l'aide de clous de 20 mm (4). La pellicule est de couleur blanche à droite de la route et jaune à gauche.
- ③ L'assemblage nécessite un boulon A307 15,88 (5/8") x 457 mm, avec écrou et rondelle.
- ④ En présence d'une bordure, la hauteur fonctionnelle de la glissière doit être mesurée conformément à la figure 3.4-2.

Notes :

- le traitement des extrémités pour une route où la vitesse affichée est de 50 km/h et moins doit être effectué conformément au dessin normalisé GSR 002. Pour une route où la vitesse affichée est supérieure à 50 km/h, un dispositif d'extrémité de glissière semi-rigide doit être utilisé;
- toutes les pièces métalliques doivent être galvanisées;
- le détail des boulons est indiqué au dessin normalisé GSR 050;
- les cotes sont en millimètres.

MATÉRIAUX — NORMES APPLICABLES

Bois	Tome VII, norme 11101	Éléments de glissement	Tome VII, norme 6301
Boulons, tiges d'ancrage, écrous et rondelles	Tome VII, norme 6201	Galvanisation	ASTM A123/A123M
Clous	ASTM F1667	Pellicules rétro réfléchissantes, type XI	Tome VII, norme 14101

Contenu normatif

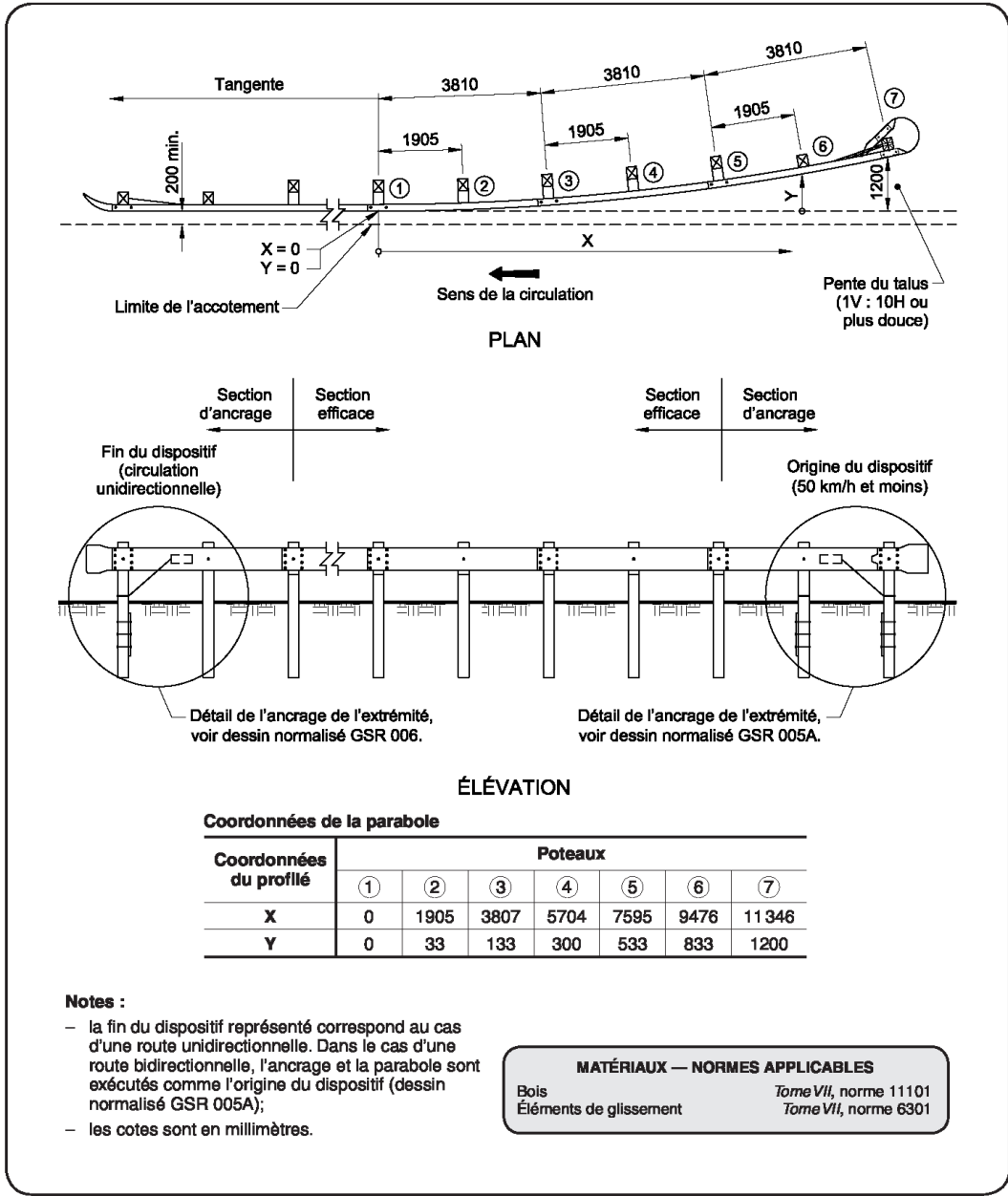
Tome <b>VIII</b>
Chapitre <b>3</b>
Numéro <b>GSR 002</b>
Date <b>2014 09 30</b>

**DESSIN NORMALISÉ**

**GLISSIÈRE SEMI-RIGIDE AVEC  
PROFILÉ D'ACIER À DOUBLE  
ONDULATION SUR POTEAUX DE  
BOIS – TRAITEMENT DES EXTRÉMITÉS  
(50 km/h ET MOINS)**



**NORME**





DESSIN NORMALISÉ

GLISSIÈRE SEMI-RIGIDE AVEC PROFILÉ  
D'ACIER À DOUBLE ONDULATION –  
TRAITEMENT DE L'ORIGINE  
(50 km/h ET MOINS)

Tome

VIII

Chapitre

3

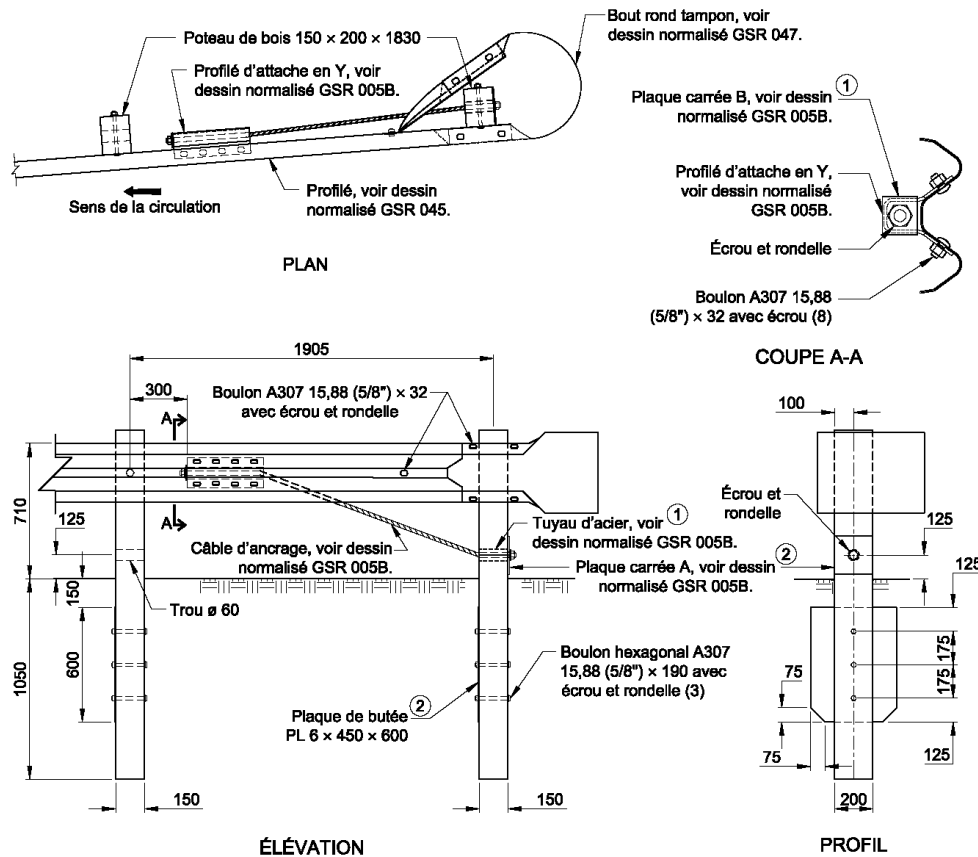
Numéro

GSR 005A

Date

2015 09 30

NORME



① Limite élastique de 350 MPa.

② Limite élastique de 260 MPa.

Notes :

- la norme ASTM A36 / A36M est acceptable en remplacement de la norme CSA G40.20 / G40.21 (Tome VII, norme 6101);
- toutes les pièces métalliques doivent être galvanisées;
- le détail des boulons est indiqué au dessin normalisé GSR 050;
- les cotes sont en millimètres.

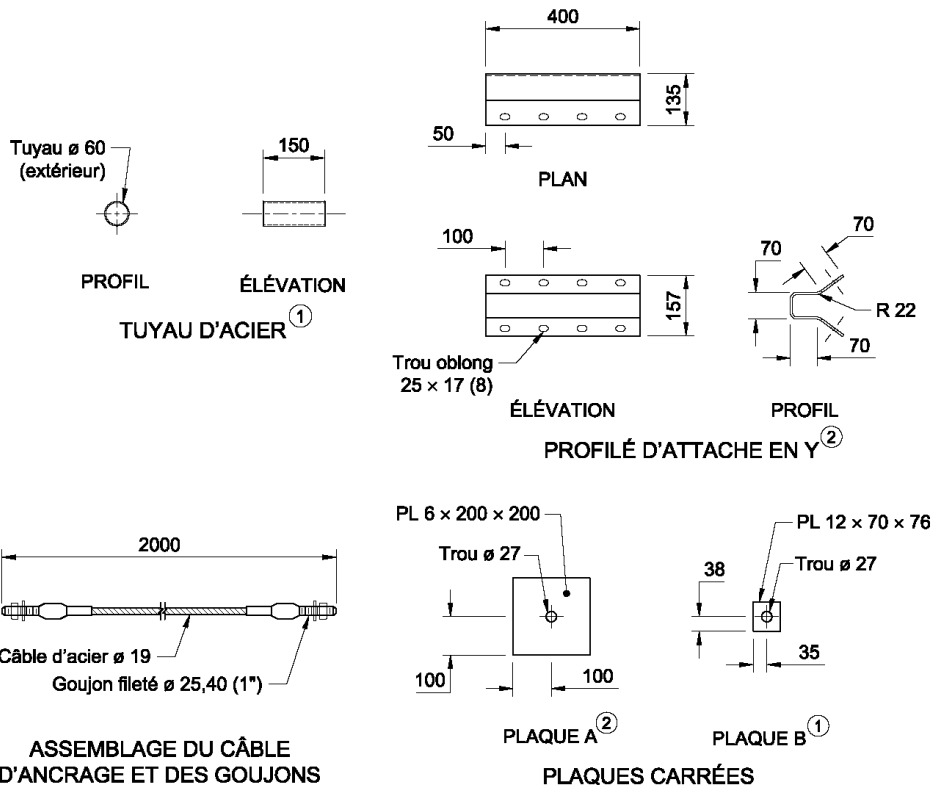
MATÉRIAUX — NORMES APPLICABLES

Aciers de construction, type W,	Tome VII, norme 6101
Bois	Tome VII, norme 11101
Boulons, tiges d'ancrage,	Tome VII, norme 6201
écrous et rondelles	Tome VII, norme 6301
Éléments de glissement	ASTM A123 / A123M
Galvanisation	

Contenu normatif

NORME

GLISSIÈRE SEMI-RIGIDE AVEC PROFILÉ  
D'ACIER À DOUBLE ONDULATION –  
TRAITEMENT D'EXTRÉMITÉ,  
PIÈCES D'ANCRAGE



- ① Limite élastique de 350 MPa.  
② Limite élastique de 260 MPa.

Notes :

- le tuyau d'acier a une épaisseur minimale de 3 mm;
- la plaque d'acier du profilé d'attache en Y a une épaisseur de 6 mm;
- la norme ASTM A36/A36M est acceptable en remplacement de la norme CSA G40.20/G40.21 (Tome VII, norme 6101);
- toutes les pièces métalliques doivent être galvanisées;
- les cotes sont en millimètres.

MATÉRIAUX — NORMES APPLICABLES

Aciers de construction, type W  
Boulons, tiges d'ancrage,  
écrous et rondelles

Tome VII, norme 6101  
Tome VII, norme 6201

Éléments de glissement  
Galvanisation

Tome VII, norme 6301  
ASTM A123/A123M

Contenu normatif

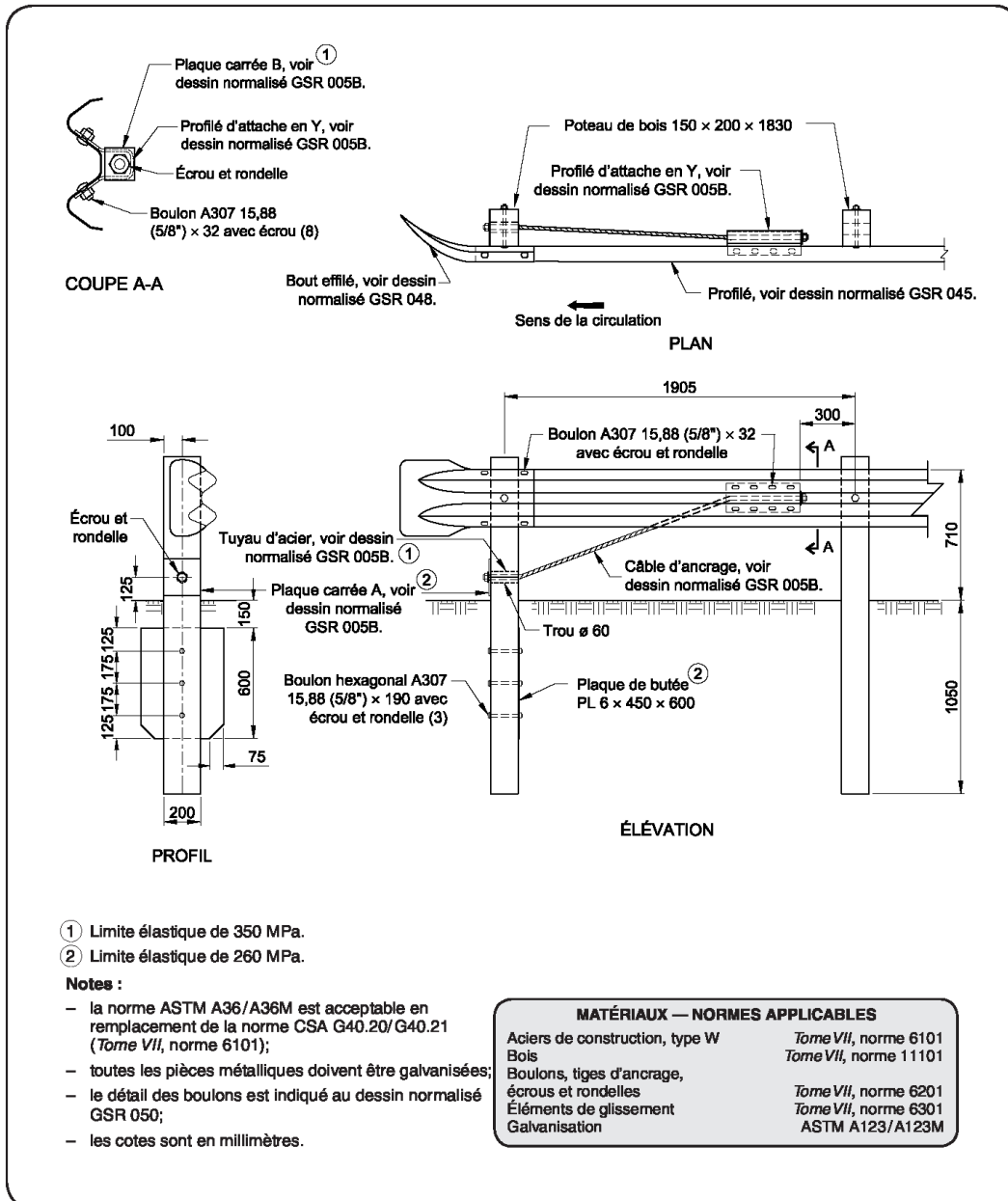
Tome <b>VIII</b>
Chapitre <b>3</b>
Numéro <b>GSR 006</b>
Date <b>2015 09 30</b>

**DESSIN NORMALISÉ**

**GLISSIÈRE SEMI-RIGIDE AVEC  
PROFILÉ D'ACIER À DOUBLE  
ONDULATION – TRAITEMENT DE LA FIN  
(CIRCULATION UNIDIRECTIONNELLE)**



**NORME**



Transports,  
Mobilité durable  
et Électrification  
des transports

Québec

NORME

DESSIN NORMALISÉ

GLISSIÈRE SEMI-RIGIDE LATÉRALE  
AVEC PROFILÉ D'ACIER  
À DOUBLE ONDULATION –  
TRANSITION DE RIGIDITÉ TL-2

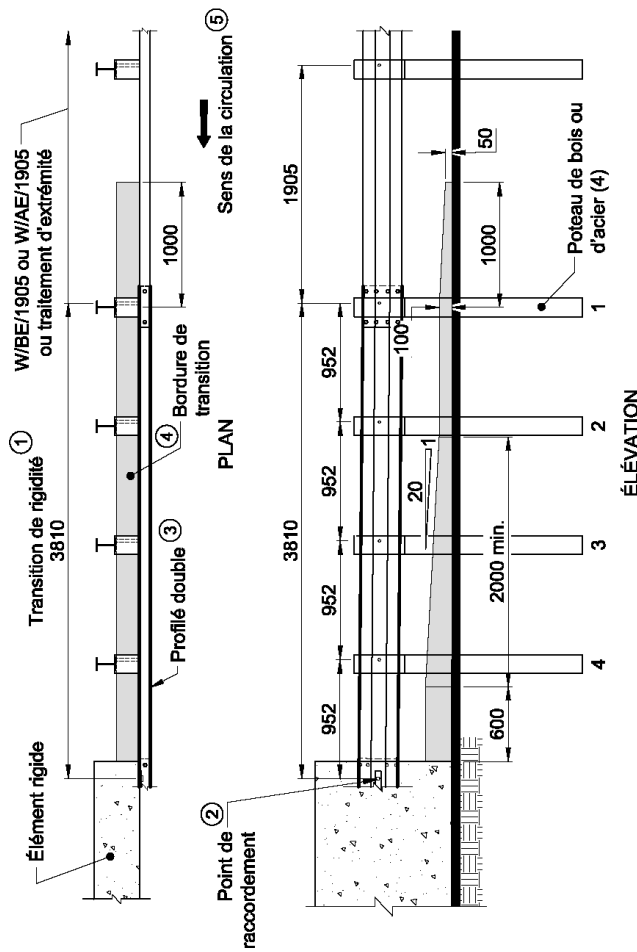
Tome  
**VIII**

Chapitre  
**3**

Numéro  
**GSR 010B**

Date  
**2018 10 30**

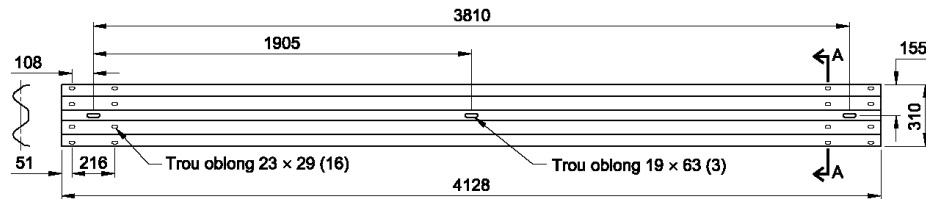
Contenu normatif



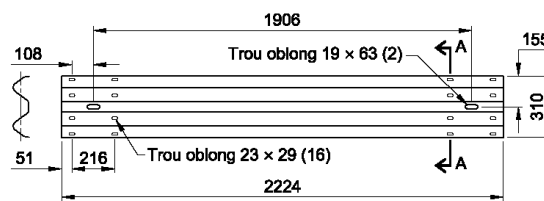
**MATÉRIAUX — NORMES APPLICABLES**

Aciers de construction, type W, limite élastique minimale 260 MPa	Tome VII, norme 6101
Béton	Tome VII, norme 3101
• bordure coulée, type IV ou V	Tome VII, norme 11101
• bordure moulée, type VI ou VII	Tome VII, norme 6201
Bois	Tome VII, norme 6301
Boulons, tiges d'ancrage, écrous et rondelles	ASTM F1667
Clous	ASTM A123/A123M
Éléments de glissement	Tome VII, norme 14101
Galvanisation	ASTM A123/A123M
Pellicules rétro réfléchissantes, type XI	Tome XI

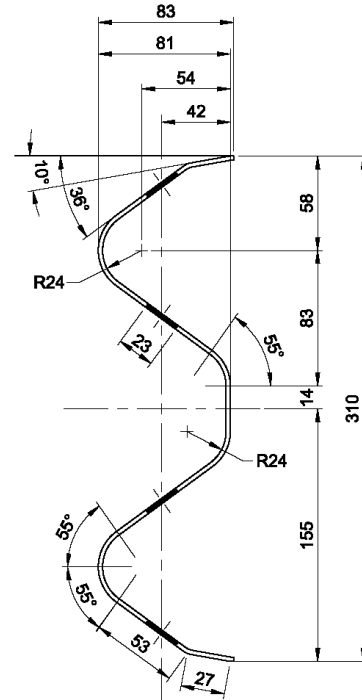
- Notes :**
- 1 Lorsque la glissière semi-rigide est raccordée à une glissière rigide latérale dont l'origine est conforme aux dessins normalisés GR 010 et GR 011, la transition est exécutée conformément au dessin normalisé GSR 012B.
  - 2 Le détail du raccordement correspondant à l'élément rigide en présence est indiqué aux dessins normalisés GSR 020 à GSR 026B.
  - 3 Cette transition de rigidité nécessite l'utilisation de deux profilés d'acier à double ondulation emboîtés.
  - 4 La bordure de transition doit être réalisée conformément au Tome II – Construction routière, chapitre 4 « Bordures ». Elle est prolongée, au besoin, pour améliorer le drainage. Une transition de forme et de dimensions doit être réalisée pour l'adapter au chasse-neige de l'élément rigide.
  - 5 Sur une route unidirectionnelle, la transition de rigidité n'est pas requise à la sortie de la structure ni à la fin de la glissière rigide.
- Notes :**
- la transition de rigidité n'est pas requise à l'approche d'un pont acier-bois;
  - les cotes sont en millimètres.



PROFILÉ DE 3810 mm<sup>①</sup>



PROFILÉ DE 1905 mm



COUPE A-A

- ① Si requis, le profilé peut être courbé selon les rayons de courbure minimaux suivants :
- forme concave : 3000 mm;
  - forme convexe : 1500 mm.

**Notes :**

- l'épaisseur de l'acier du profilé, avant galvanisation, est de 2,65 mm;
- la galvanisation du profilé doit être faite après le pliage, la coupe et le perçage;
- les tolérances de fabrication sont de  $\pm 6$  mm pour les dimensions et de  $\pm 3$  mm pour le positionnement des trous;
- les cotes sont en millimètres.

**MATÉRIAUX — NORMES APPLICABLES**

Éléments de glissement

Tome VII, norme 6301 | Galvanisation

ASTM A123/A123M

Contenu normatif