PARSONS

SB ENGINEERING

PARKS CANADA

Chambly Canal National Historic Site

Bridge 4 – Swing Bridge Rehabilitation

Ref. No. Parks Canada: RUC-02-212

ISSUED FOR TENDER

TECHNICAL SPECIFICATIONS

May 8, 2015

Parsons Ref. No.: BO2280BOA

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Chambly Canal National Historic Site

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TECHNICAL SPECIFICATIONS

Structural and civil prepared by: Geneviève Desrochers, P.Eng.

INGÉNIEURE
Ann Lucie St-Jean
120390
QUÉBEC

2015-05-13

Structural and civil reviewed by: Ann St-Jean, Project Manager, P.Eng., ing.

ORDRE DES INGÉNIEURS DU QUÉBEC
Permis Temporaire / Temporary Licence
Nom / Name Paul Bandlow
No. OIQ PT01891
Nul après / Void After 2016-04-09
Site: PCA BRIDGE 4 / CHAMBLY

2015-05-12

Mechanical prepared and reviewed by: Paul Bandlow

END OF SECTION

Part 1 General

1.1 WORK PERIOD

.1 Submit in the first 30 days following contract award the shop drawings of the center bearing.

.2 Following contract award, submit a written request for approval by the Departmental Representative to access the site to perform surveys and measurements in the preparation of the work. Submit a health and safety plan and a work plan identifying amongst others the period and duration of the proposed work. The preparatory work must not impede in any way on navigation and must meet all conditions of traffic and navigation control identified in Section 01 35 00.06 Special Procedures for Traffic Control. Ensure the presence of a Department's bridge operator to operate the swing bridge. The Departmental Representative may reject performance of preparatory works and report these until after October 26, 2015.

.3 Mobilization to site and work can start after October 26, 2015.

.4 Make allowances for a reasonable delay within the period of work for weather that prevent or hinder the performance of work.

.5 If, during the work, serious causes of delays occur beyond its control, request in writing to the Departmental Representative for a time extension providing the reasons. Request must reach the Departmental Representative at least one month before the expiry of the stipulated delay.

.6 In cases of force majeure and for reasons acceptable to Departmental Representative, the duration of the extension is determined, and the new deadline is recorded by contract amendment.

.7 Neither the acceptance by the Departmental Representative to change the delay stipulated in the contract nor the submission by the Contractor of an accelerated schedule, or the request and execution of unforeseen or additional work or any other cause of non-compliance of the stipulated delay can be an excuse for the Contractor to claim damages resulting from extension of the work if the Department has not slowed or stopped on its own and explicitly, the work of the Contractor.

1.2 WORK SCHEDULE

.1 Work shall be completed Monday to Friday between 6:00 am and 6:00 pm according to municipal regulations and acceptable noise levels. Depending on the requested reasons and justifications, the Work could be allowed outside of this period, upon request two (2) weeks in advance and with approval from the Departmental Representative.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises rehabilitation of Bridge 4, located across the historic Chambly Canal in Chambly, Quebec. The Work of this Contract comprises, but is not limited to:

.1 Installation of traffic control measures;

.2 Installation of environmental protection measures;

.3 Installation of security fencing around the construction area;

.4 Jacking and supporting the bridge temporarily;

.5 Removal of the existing center bearing, repairing the concrete below the bearing and installation of a new center bearing, non-shrink grout pad and anchor bolts;

.6 Repairs to the steel structure;

.7 Removal of the existing balance wheel rail, repairing the concrete below the rail and reinstallation of the balance wheel rail with a new non-shrink grout pad and new anchor bolts. Reinstall the rail ensuring a correct alignment and perform adjustments to the balance wheel clearances;

.8 Removal of the existing rack and repairing the concrete below the rack. Replace damaged rack segments and reinstall the rack with a proper alignment with a new non-shrink grout pad, new anchors and new clips;

.9 Install ballast and perform balance testing;

.10 Concrete repairs to the west abutment backwall;

.11 Removal of the existing supports at the west abutments and repairing the concrete below the supports. Reinstalling the existing supports with new anchors ensuring the bridge and the approaches line up vertically;

.12 Span drive adjustments, if required, and

.13 Cleaning of the site during and at the end of the Work.

1.4 CONTRACT METHOD

.1 Construct Work under a single contract with unit price or lump sum price for the work packages identified in the Contract Item List and as identified in section 01 29 00 Payment Procedures. All unit prices and lump sum prices are stipulated prices; the Contractor is committed to completing the work at this price, gain or loss.

1.5 CONTRACTOR USE OF PREMISES

.1 Unrestricted use of site after October 26, 2015.

.2 Co-ordinate use of premises under direction of Departmental Representative, prior to October 26, 2015.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract. Refer to Section 01 52 00 Construction Facilities for staging area.

.4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.6 At completion of work, the existing work shall be in an state equal to or better than that which existed before new work started.

1.6 OTHER WORK IN THE VICINITY OF THE SITE

.1 Contractor is advised that work is scheduled at Bridge 1 and Lock 5 during the same work period. Bridge 1 crosses the Chambly Canal north-east of Bridge 4. Lock 5 crosses the Chambly Canal south of Bridge 4.

1.7 OWNER OCCUPANCY

.1 Owner will occupy the premises prior to October 26, 2015. Co-operate with Owner in scheduling surveys and measurements prior to this date, if required.

.2 Owner will not occupy premises during construction period, starting October 26, 2015. Contractor is responsible to operate the bridge during the construction period. Contractor must obtain training from the Department to operate the bridge. Request the training to the Departmental Representative, at least two (2) weeks in advance.

1.8 EXISTING SERVICES

.1 Protect existing electrical supply to the bridge and bridge operator building. Establish exact location and extent of electrical supply before starting Work.

.2 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.3 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities.

.4 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power services. Adhere to approved schedule and provide notice to affected parties.

.5 Where unknown services are encountered, immediately advise the Departmental Representative and confirm findings in writing.

1.9 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

.4 Contract Drawings.
.5 Specifications.
.6 Addenda.
.7 Reviewed Shop Drawings.
.8 List of Outstanding Shop Drawings.
.9 Change Orders.
.10 Other Modifications to Contract.
.11 Field Test Reports.
.12 Copy of Approved Work Schedule.
.13 Health and Safety Plan and Other Safety Related Documents.
.14 Other documents as specified.

Part 2 Products

2.2 NOT USED

.1 Not used.

Part 3 Execution

3.2 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 METHOD OF PAYMENT

.1 Method of payment:

.1 Each unit or lump sum contract price is a stipulated price; the Contractor is committed to completing the work at this price, gain or loss. The unit or lump sum price of an element shall compensate all expenses, all work, disbursements, payments, direct or indirect costs, mobilization, demobilization, and all acts, all the facts, all the responsibilities, obligations, omissions and errors of the Contractor related to the realization of this element.

.2 The necessary material supply, labour, tools, equipment, protection, transportation, customs, administration fees, profits, financing, etc. to execute the Work are included in the following items, unless otherwise noted.

.3 Items described below must cover potential losses or damages resulting from the nature of the work, the fluctuation of prices and wages, business risk, strikes, delays not attributable to the Ministry, transportation restrictions, accidents and the action of nature's elements, especially those during the winter period for this project.

.4 All prices are in Canadian dollars and do not include the goods and services tax (GST) and the Quebec sales tax (QST)

.5 Will be taken into account for purposes of measurement, the materials actually incorporated in the work and accepted by Departmental Representative.

.6 The items presented in the Contract Item List are the following:

.1 <u>Site organization:</u>

.1 This item is paid on a lump sum basis to offset all expenses necessary for the execution of the Work and the costs not part of other items in the Contract Item List, in accordance with the specifications. The price covers, but is not limited to:

.1 Contractor's field offices with services as required (heating and ventilation, electricity, water, furnishings, telephone, internet, etc...).

.2 Sanitary facilities.

.3 Insurance and mobilisation and demobilisation.

.4 Coordination required with the City of Chambly and other stakeholders, including obtaining the required permits to complete the Work.

.5 Environmental protection measures that are not part of specific items in the Contract Item List. The price covers, but is not limited to, the supply of material, labour, and all incidental expenses.

.6 Cleaning of the site described in section 01 74 11 Cleaning, excluding the final cleaning of the site.

.7 Quality control described in section 01 45 00 Quality Control.

.8 All that is described in section 01 35 29 Health and Safety Requirements and that is not part of other items listed in the Contract Item List.

.9 Temporary utility services.

.10 Land leasing and/or storage costs for material storage.

.2 Payment of the site organization shall be prorated based on estimates of the work performed after mobilization to the site. A minimum of 25% shall be paid with the first progress payment after mobilization to the site.

.2 Traffic control:

.1 Traffic control performed within contractual deadlines is paid on a lump sum basis. The price covers the costs of signage plans, signaling devices, labour, transportation, supply and installation of signs for the duration of the work, commissioning, closing and reopening of the roads, the necessary modifications during the work, covering and uncovering signs, access road maintenance, dismantling, regular maintenance of roads, and all incidental expenses.

.2 Cost of traffic control also covers concrete barriers. The price includes, but is not limited to, supply for the duration of the work, transportation, installation, maintenance, repair or replacement in case of breakage, displacement following an impact, removal at the end of the work and the cleaning of the premises, and includes any incidental expenses.

.3 Cost of traffic control also covers compensation for the person in charge of the traffic control and its representatives, the staff assigned to the installation of traffic control, the staff assigned to the maintenance of traffic control required by the Contractor’s or sub-contractors’ activities, required equipment, travel, signalisation adjustments made by the traffic control team, and all incidental expenses.

.4 Cost of traffic control also covers the project sign. The price includes, but is not limited to, supply of equipment, material, regular maintenance, relocating and dismantling, and all incidental expenses.

.5 Payment of traffic control plan shall be prorated based on estimates of the work performed following installation of traffic signs on site. A minimum of 25% shall be paid with the first progress payment following installation of traffic signs on site.

.3 Wire mesh construction fence:

.1 Fences are paid on a lump sum basis. The price covers the supply of all materials and accessories, transportation and installation, maintenance, removal of the fences when they are no longer required and transporting them offsite. The price also includes all incidental expenses.

.2 The payment for the wire mesh construction fence will be performed in two payments: 60% upon successful installation and 40% upon removal.

.4 Final cleaning:

.1 The final cleaning is paid on a lump sum basis and includes touch-ups required to correct the profiles to fully comply with theoretical lines along and across, all work required for the cleaning and restoration of the site including topsoil and mechanical seeding where the grass has been damaged. The price also covers the supply of materials and equipment, the implementation and the disposal of waste materials and includes any incidental expenses.

.5 Field measurements and survey:

.1 The field measurements and survey are paid on a lump sum basis and include, but are not limited to, the initial survey, the intermediate survey and the final survey, including strain gage testing, as well as the results reports for each of the surveys.

.2 Payment of field measurements and survey will be performed in three payments: 30% upon completion and submittal of initial survey report, 30% upon completion and submittal of intermediate survey report and 40% upon completion and submittal of final survey report.

.6 Replacement of center bearing:

.1 The replacement of the center bearing is paid on a lump sum basis and includes, but is not limited to, the submittal of required documents, the removal and disposal of the existing bearing, survey and measurements program, the supply of material, commissioning, and all incidental expenses for the installation of a new bearing.

.2 The cost also covers all demolition costs of the cement grout and concrete, for the replacement of the center bearing, including the cost of supply of material, the performance of the work and the waste disposal of demolition materials.

.3 The cost also covers anchors required for the replacement of the center bearing, including cost of supply of metal rods and cement grout or chemical anchor system, boring holes, performance of the work and performing tests on trial anchors when specified in drawings and specifications.

.4 The cost also covers the price for environmental protection measures, especially during removal of the existing lubricating basin.

.7 Balance wheel rail and wheels adjustments:

.1 The work for the adjustments of the balance wheel rail is paid on a lump sum basis. The cost covers, but is not limited to, the submittal of required documents, the removal of the existing rail and balance wheels, survey and measurements program, as well as the supply of materials, performance of work, and all

incidental expenses to reinstall the rail and balance wheels and perform necessary adjustments.

.2 The cost also covers all demolition costs of the cement grout and concrete, for the adjustments to the balance wheel rail, including the cost of supply of material, performance of the work and waste disposal of demolition materials.

.3 The cost also covers anchors required for the adjustments of the balance wheel rail, including cost of supply of metal rods and cement grout or chemical anchor system, boring holes, performance of the work and performing tests on trial anchors when specified in drawings and specifications.

.8 Rack repairs and adjustments:

.1 The work for the rack repairs and adjustments is paid on a lump sum basis. The cost covers, but is not limited to, a survey and measurement program, the submittal of required documents, the removal of the entire existing rack as well as the supply of material, the performance of work, and all incidental expenses to repair, replace a section, adjust and reinstall the rack.

.2 The cost also covers all demolition costs of the cement grout and concrete, for the rack repairs and adjustments, including the cost of supply of material, performance of the work and waste disposal of demolition materials.

.3 The cost also covers anchors required for the rack repairs and adjustments, including cost of supply of metal rods and cement grout or chemical anchor system, boring holes, performance of the work and performing tests on trial anchors when specified in drawings and specifications.

.9 Castor support adjustments:

.1 The work for the castor support adjustments is paid on a lump sum basis. The cost covers, but is not limited to, a survey and measurement program, the submittal of required documents, the removal of the existing castor strike plates, the surface preparation of the existing concrete, the non-shrink grout, and the supply of material, performance of work, and all incidental expenses to reinstall the plates and perform required adjustments.

.2 The cost also covers the all demolition costs of the cement grout and concrete, for the castor support adjustments, including the cost of supply of material, performance of the work and waste disposal of demolition materials.

.3 The cost also covers anchors required for castor support adjustments, including cost of supply of metal rods and cement grout or chemical anchor system, boring holes, performance of the work and performing tests on trial anchors when specified in drawings and specifications.

.10 Jacking and temporary support:

.1 The jacking and temporary support of the bridge is paid on a lump sum basis. The cost covers, but is not limited to, the design and engineering fees, the submittal of required documents, the supply of materials, the performance of the work, maintenance, dismantling and reinstatement of the site, and includes all incidental expenses.

.2 The payment of the jacking and temporary support will be performed in two payments: 75% upon jacking of the bridge and 25% upon removal and commissioning.

.11 Cleaning of foundation units:

.1 The cleaning of the foundation units is paid on a lump sum basis. The cost covers, but is not limited to, the submittal of required documents, the supply of material, the performance of the work, as well as the disposal of waste material and includes all incidental expenses.

.12 Dowels 10M into concrete

.1 10M dowels into concrete are paid on a lump sum basis. The cost covers, but is not limited to, the submittal of required documents, the supply of material, galvanizing where stipulated in the drawings and specifications, drilling and cleaning of holes, epoxy adhesive, steel reinforcement installation, performing the work and all incidental expenses.

.13 Structural steel (angle at the west abutment):

.1 The structural steel for the angles at the west abutment is paid on a lump sum basis. The cost covers, but is not limited to, the submittal of required documents, the supply of required documents, the supply of materials including dowels, fabrication including welding of the dowels, the control of welds, handling, transportation and installation, and includes all incidental expenses.

.2 The cost also covers all expenses incurred by the Contractor for the dismantling of the existing plate including disposal of waste materials.

.3 The cost also covers the metalizing of the angle in shop.

.14 Concrete repairs of the west abutment backwall:

.1 Concrete repairs are paid on a lump sum basis. The price covers, but is not limited to:

.1 Environmental protection;

.2 Demolition of the existing concrete;

.3 Supply of the concrete mix data sheets;

.4 Supply of the materials;

.5 Supply of the formwork

.6 Preparation of existing surfaces to remain

.7 Concrete curing,

.8 Correction;

.9 Surface cleaning;

.10 Concrete finishing;

.11 Waste management;

.12 Implementation and

.13 All incidental expenses.

.2 The cost also covers the costs related to heating required for cold weather concreting.

.15 Mortar refacing of the west abutment backwall:

.1 Mortar refacing is paid on a lump sum basis. The price covers, but is not limited to:

.1 Environmental protection;

.2 Supply of the data sheets;

.3 Supply of the materials;

.4 Supply of the formwork

.5 Preparation of existing surfaces to remain

.6 Curing,

.7 Correction;

.8 Surface cleaning;

.9 Finishing;

.10 Waste management;

.11 Implementation and

.12 All incidental expenses.

.2 The cost also covers the costs related to heating required for cold weather work.

.16 Replacement of beam assembly plates at the center bearing:

.1 The replacement of beam assembly plates at the center bearing is paid on a lump sum basis. The cost covers, but is not limited to, the submittal of required documents, the supply of materials, the fabrication, the control of welds, handling, transportation and installation, and it includes all incidental expenses.

.2 The cost also covers the expenses incurred by the Contractor for the removal of the existing plates including disposal of waste material.

.3 The cost also covers the cost of bolts, nuts and washers including the supply of material, transportation and installation.

.4 The cost also covers steel coating both in shop and in the field of bolted assembly components and touch-ups in the field.

.5 The cost also covers the galvanizing of bolts, nuts and washers.

.6 The cost alsocovers environmental protection measures for the coating works. The cost covers, but is not limited to, the supply of materials, the implementation, waste recovery, storage on site, transportation and disposal of waste, full removal of containment system as well as all incidental expenses.

.17 Replacement of stringer:

.1 The replacement of stringer is paid on a lump sum basis. The cost covers, but is not limited to, the submittal of documents required, the supply of materials, the fabrication, the control of welds, handling, transportation and installation, and it includes all incidental expenses.

.2 The cost also covers the expenses incurred by the Contractor for the removal of the existing stringer including disposal of waste material.

.3 The cost also covers the cost of bolts, nuts and washers including the supply of material, transportation and installation.

.4 The cost also covers steel coating both in shop and in the field of bolted assembly components and touch-ups in the field.

.5 The cost also covers the galvanizing of bolts, nuts and washers.

.6 The cost also covers environmental protection measures for the coating works. The cost covers, but is not limited to, the supply of materials, the implementation, waste recovery, storage on site, transportation and disposal of waste, full removal of containment system as well as all incidental expenses.

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 11 00 Summary of Work.

.2 Section 01 35 29.06 Health and Safety Requirements

1.2 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit 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.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work are co-ordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.10 Keep one reviewed copy of each submission on site.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 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.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in the province of Quebec, Canada.

.3 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.

.4 Allow seven (7) days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter, containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.10 Submit one (1) electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit one (1) electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit one (1) electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within three (3) years of date of contract award for project.

.13 Submit one (1) electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit one (1) electronic copy of manufacturers' instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit one (1) electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.17 Submit one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.

.18 Delete information not applicable to project.

.19 Supplement standard information to provide details applicable to project.

.20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.21 The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that the Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.4 SAMPLES

.1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.

.2 Deliver samples prepaid to Departmental Representative's site office.

.3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.4 Where colour, pattern or texture is criterion, submit full range of samples.

.5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

.7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit the required documents to the Commission de la Santé et la Sécurité au Travail (CSST).

.2 Submit transcription of insurance immediately after award of Contract.

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 REFERENCES

.1 Ministère des Transports du Québec (Transports Québec)

.1 *Tome V – Signalisation routière de la collection Normes – Ouvrages routiers.*

1.2 PROTECTION OF PUBLIC TRAFFIC

.1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.

.2 When working on travelled way:

.1 Place equipment in position to minimize interference and hazard to travelling public.

.2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.

.3 Do not leave equipment on travelled way overnight.

.3 Close lanes of road only after receipt of written approval from Departmental Representative.

.1 Before re-routing traffic, erect suitable signs and devices to *Tome V – Signalisation routière de la collection Normes – Ouvrages routiers de Transports Québec* and contractual drawings.

1.3 INFORMATIONAL AND WARNING DEVICES

.1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.

.2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to *Tome V – Signalisation routière de la collection Normes – Ouvrages routiers de Transports Québec* and contractual drawings.

.3 Continually maintain traffic control devices in use:

.1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.

.2 Remove or cover signs which do not apply to conditions existing from day to day.

1.4 CONTROL OF PUBLIC TRAFFIC

.1 Provide competent flag personnel, trained in accordance with, and properly equipped to *Tome V – Signalisation routière de la collection Normes – Ouvrages routiers de Transports Québec* for situations as follows:

.1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.

.2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.

.3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.

.4 Where temporary protection is required while other traffic control devices are being erected or taken down.

.5 For emergency protection when other traffic control devices are not readily available.

.6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.

1.5 TRAFFIC REQUIREMENTS

.1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:

.1 Montée Pont 4 from Ste-Thérèse Road to Canal Road.

.1 Between contract award and October 26, 2105 and after April 30, 2016, delays to public traffic: maximum 60 minutes between 10AM and 2PM. If a delay of more than 60 minutes is required, obtain approval from Departmental Representativve at least 3 weeks prior to the delay to allow for issuance of a communication plan.

.2 Between October 26, 2015 and April 30, 2016, road closed to public traffic when detour provided along existing routes paralleling right-of-way and as shown on contract drawings. The road must remain accessible on the west side of the bridge to the snow removal company and the owner of the land in the north-west quadrant.

.2 Maintain and protect traffic on Canal Road and the multi-purpose path along the Chambly Canal throughout period of contract.

1.6 NAVIGATION REQUIREMENTS

.1 Maintain existing conditions for navigation throughout period of contract, as follows:

.1 Chambly Canal.

.1 Between contract award and October 26, 2015 and after April 30, 2016, no interruptions to navigation are permitted. Ensure the presence of a Ministry’s operator when operating the bridge is required in this period.

.2 Between October 26, 2015 and April 30, 2016, the Chambly Canal is dewatered. Operate the swing bridge as required. Obtain training by the Ministry to operate the bridge.

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 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations

.2 Province of Quebec

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

.3 Health Canada/Workplace Hazardous Materials Information Systems (WHIMS)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within seven (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 found in work plan.

.3 Submit to the satisfaction of the Departmental Representative in order to obtain access to the site, and for all work to be performed on site, the form Attestation and Proof of Compliance with Occupational Health and Safety (OHS) from Parks Canada.

.4 Submit one (1) copy of Contractor's authorized representative's work site health and safety inspection reports to the Departmental Representative weekly.

.5 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.6 Submit copies of incident and accident reports.

.7 Submit WHMIS MSDS - Material Safety Data Sheets.

.8 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within seven (7) days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.

.9 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.10 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

.11 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.3 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

.2 Contractor shall be responsible and assume the Principal Contractor role for the work zone. Contractor shall provide a written acknowledgement of this responsibility within 3 weeks of contract award. Contractor to submit written acknowledgement to CSST along with Ouverture de Chantier Notice. Overture de Chantier Notice shall be submitted at least 10 days before beginning the Work.

.3 Work zone locations include:

.1 Bridge 4, across the Chambly Canal, located in Chambly, Quebec.

.2 Land at each end of the bridge as outlined in the Contract Documents.

.3 Staging, storage and parking areas.

.4 Contractor shall agree to install proper site separation and identification in order to maintain time and space at all times throughout life of project.

1.4 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

1.5 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.6 REGULATORY REQUIREMENTS

.1 Do Work in accordance with the authority having jurisdiction over the work site.

1.7 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 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.8 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.

1.9 COMPLIANCE REQUIREMENTS

.1 Comply with R.S.Q., c. S-2.1, an Act respecting Health and Safety, and c. S-2.1, r.4 Safety Code for the Construction Industry.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 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 Departmental Representative verbally and in writing.

1.11 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, and in consultation with Departmental Representative.

1.12 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.13 POWDER ACTUATED DEVICES

.1 Use powder actuated devices only after receipt of written permission from Departmental Representative.

1.14 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.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Attestation and Proof of Compliance with Occupational Health and Safety (OHS)

Submission of this completed form, satisfactory to Parks Canada, is a condition of gaining access to the work place.

Instructions:

Prime contractor must sign this form for all projects undertaken at Parks Canada work places.

This form is to be administered by the Project Manager and completed by the Prime Contractor AFTER contract award.

Parks Canada recognizes that federal OHS legislation places certain specific responsibilities upon Parks Canada as owner of the work place. In order to meet those responsibilities, Parks Canada is implementing a contractor safety regime that will ensure that roles and responsibilities assigned under Part II of the *Canada Labour Code* and the *Canada Occupational Health and Safety Regulations* are implemented and observed when involving contractor(s) to undertake works in Parks Canada work places.

Parks Canada Responsible Authority/Project Lead	Address	Contact Information
Project Manager/Contracting Authority (delete as required)		
Prime Contractor		
Subcontractor(s) (add additional fields as required)		

Location of Work

General Description of Work to be Completed

Mark “Yes” where applicable.

	A meeting has been held to discuss hazards and access to the work place and all known and foreseeable hazards have been identified to the contractor and/or subcontractor(s)
	The contractor and/or its subcontractor(s) will comply with all federal and provincial/territorial legislation and Parks Canada's policies and procedures, regarding occupational health and safety.
	The contractor and/or its subcontractor(s) will provide all prescribed safety materials, equipment, devices and clothing.
	The contractor and/or its subcontractor(s) will ensure that its employees are familiar with and use all prescribed safety materials, equipment, devices and clothing at all times.
	The contractor and/or its subcontractor(s) will ensure that its activities do not endanger the health and safety of Parks Canada employees.
	The contractor and/or its subcontractor(s) has inspected the site and has carried out a hazard assessment and has put in place a health and safety plan and informed its employees accordingly, prior to the commencement of the work.
	Where a contractor and/or its subcontractor(s) will be storing, handling or using hazardous substances in the work place, it will place warning signs at access points warning persons of the presence of the substances and any precautions to be taken to prevent or reduce any hazard of injury or death.
	The contractor and/or its subcontractor(s) will ensure that its employees are instructed in respect of any emergency procedures applicable to the site.

I, _____ (contractor), certify that I have read, understood and attest that my firm, employees and all sub-contractors will comply with the requirements set out in this document and the terms and conditions of the contract.

Name _____ Signature _____

Date _____

Part 1 General

1.1 REFERENCES

.1 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 humans; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.

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 and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.

.4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.

.5 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.6 Include in Environmental Protection Plan:

.1 Name[s] of person[s] responsible for ensuring adherence to Environmental Protection Plan.

.2 Name[s] and qualifications of person[s] responsible for manifesting hazardous waste to be removed from site.

.3 Name[s] and qualifications of person[s] responsible for training site personnel.

.4 Descriptions of environmental protection personnel training program.

.5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.6 Drawings indicating locations of proposed material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.7 Traffic control plans, including measures to reduce erosion of temporary roadbeds by the movement of construction vehicles, especially in wet weather.

.1 These plans must include measures to reduce the carriage of substances on public roads by vehicles or runoff.

.8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.

.1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.

.9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.

.12 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.

.13 Waste Water Management Plan identifying methods and procedures for management and 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.

.14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.3 FIRES

.1 Fires and burning of rubbish on site is not permitted.

1.4 DRAINAGE

.1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sediment control plan.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 SITE CLEARING AND PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties as required.

.2 Protect 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.

.3 Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas designated by Departmental Representative.

1.6 WORK ADJACENT TO WATERWAYS

.1 Construction equipment to be operated on land only. Do not use any construction equipment in or near the canal, even if the canal is dewatered.

.2 Canal to be kept free of excavated fill, waste material and debris.

.3 Do not skid logs or construction materials across the canal.

.4 In-water work is not permitted.

.5 Spills of waste water, oil, chemicals or other contaminants from the construction site is prohibited.

.6 Full equipment with gasoline at a distance of at least 15 meters from the canal.

1.7 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this Contract.

.2 Control emissions from equipment and plant 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 where directed by Departmental Representative.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

.5 Always have a petroleum product recovery emergency kit. The kit should include enough absorbent rolls to confine petroleum products within the perimeter of the machinery involved.

1.8 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 personnel and Departmental Representative.

1.9 NOTIFICATION

.1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.

.2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.

.1 Take action only after receipt of written approval by Departmental Representative.

.3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.

.4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - 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: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.4 Waste Management: separate waste materials for reuse and recycling.

.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 13 Selective Site Demolition

.2 Section 03 10 00 Concrete Reinforcing

.3 Section 03 20 00 Concrete forming and accessories

.4 Section 03 30 00 Cast-in-Place Concrete

.5 Section 05 12 33 Structural Steel for Bridges

.6 Section 09 97 19 Painting Exterior Metal Surfaces

1.2 REFERENCES

.1 Cahier des charges et devis généraux (CCDG) 2014 by the Ministère des transports du Québec.

1.3 DEFINITIONS

.1 Quality control, carried out by the Contractor, is the act of verifying if the quality of a product is in accordance with the specifications.

.2 Quality assurance, carried out by the Departmental Representative, is the act of verifying that the quality control has been properly carried out.

1.4 QUALITY CONTROL

.1 Quality control shall be in accordance with the following sections of the Cahier des charges et devis généraux (CCDG) 2014 by the Ministère des transports du Québec.

.1 For concrete, CCDG Chapter 15.4.2

.2 For structural steel, CCDG Chapter 15.7.4.1

1.5 INSPECTION

.1 Allow Departmental 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 Departmental 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 Departmental 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, Departmental Representative shall pay cost of examination and replacement.

1.6 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by the Contractor for purpose of concrete testing. Cost of such services will be borne by the Contractor.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during testing, appointed agency will request additional testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting.

1.7 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.

1.8 PROCEDURES

.1 Notify appropriate agency and Departmental 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.

1.9 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 Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental 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 Departmental Representative.

1.10 REPORTS

.1 Submit one (1) electronic copy of inspection and test reports to Departmental Representative.

.2 Provide copies to the subcontractor of work being inspected or tested and the manufacturer or fabricator of material being inspected or tested.

1.11 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 Departmental Representative and may be authorized as recoverable.

1.12 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 Section 01 52 00 Construction Facilities

1.2 WATER SUPPLY

.1 Provide continuous supply of potable water for construction use.

.2 Parks Canada bridge operator buildings are not feed with potable water.

1.3 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Provide temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of Work.

.2 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.3 Permanent heating system of Parks Canada's bridge operator building not to be used.

.4 Be responsible for damage to Work due to failure in providing adequate heat and protection during construction.

1.4 TEMPORARY POWER AND LIGHT

.1 For the trailers, storage and parking areas, provide and pay for temporary power during construction for temporary lighting and operating of power tools. In the presence of a network, arrange for connection with appropriate utility company and pay costs for installation, maintenance and removal.

.2 At the operator building of bridges #3 and #4, maximum power supply of 200 amps is available and will be provided for construction use at current cost rates. Connect to existing power supply in accordance with Canadian Electrical Code and provide meters and switching.

.3 Provide a standby generator in case of power loss and / or power failure in the existing network and provide the necessary fuel.

1.5 TEMPORARY COMMUNICATION FACILITIES

.1 Provide and pay for temporary communication facilities necessary for own use.

.2 No communication facilities are available at Parks Canada's bridge operator buildings.

1.6 FIRE PROTECTION

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

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 29 00 Payment Procedures.

.2 Section 01 35 00.06 Special Procedures for Traffic Control.

.3 Section 01 51 00 Temporary Utilities

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-S269.2-M1987(R2003), Access Scaffolding for Construction Purposes.

.2 CAN/CSA-Z321-96(R2001), Signs and Symbols for the Occupational Environment.

1.3 INSTALLATION AND REMOVAL

.1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor.

.2 Indicate use of supplemental or other staging area, if required.

.3 Provide construction facilities in order to execute work expeditiously.

.4 Remove from site all such work after use.

1.4 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding and ladders.

1.5 SITE STORAGE/LOADING

.1 No storage on the bridge is allowed.

.2 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.

.3 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.6 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of Work or traffic.

.2 Parking will be permitted in the parking of Bridge #3 and on Montée Pont 4 following road closure, as noted on contractual drawings.

1.7 OFFICES

.1 No office for the Departmental Representative is required.

.2 Site meetings will be held at Parks Canada office in Chambly, Québec.

.3 The operator's buildings at Bridge #4 and Bridge #3 are off limit to the Contractor.

.4 Provide marked and fully stocked first-aid case in a readily available location on site.

.5 Provide an office for the Contractor as necessary in the parking of Bridge #3 or on Montée Pont 4 following road closure, as noted on the contractual drawings.

.6 No potable water is available on site. Supply cold and hot water dispensers including water supply.

.7 Subcontractors to provide their own offices as necessary. Direct location of these offices.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

.1 Storage areas are located at Bridge #3 and on Montée Pont 4 following road closure, as noted on the contractual drawings.

.2 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.

.3 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.9 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Use of sanitary facilities in the operator's buildings of Bridge #4 and Bridge #3 are not permitted.

.3 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.10 CONSTRUCTION SIGNAGE

.1 Provide and erect project sign, within three weeks prior to mobilization to site, in a location designated by Departmental Representative.

.2 Construction sign 1.2 m x 2.4 m, of wood frame and plywood construction painted with exhibit lettering produced by a professional sign painter.

.3 Indicate on sign, name of Owner, of design style established by Departmental Representative.

.4 No other signs or advertisements, other than warning signs, are permitted on site.

.5 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 enamel to CAN/CGSB-1.59 over exterior alkyd primer to CAN/CGSB 1.189.

.5 Fasteners: hot-dip galvanized steel nails and carriage bolts.

.6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay, supplied by Departmental Representative.

.6 Locate project identification sign as directed by Departmental 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.

.7 Direct requests for approval to erect Consultant/Contractor signboard to Departmental Representative. For consideration general appearance of Consultant/Contractor signboard must conform to project identification site sign. Wording in both official languages.

.8 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.

.9 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 Departmental Representative.

1.11 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Conform to Section 01 35 00.06 Special Procedures for Traffic Control.

.2 Maintain access to adjacent properties.

.3 Protect travelling public from damage to person and property.

.4 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.

.5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.6 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.7 Dust control: adequate to ensure safe operation at all times.

.8 Lighting: to assure full and clear visibility for work areas during night work operations.

.9 Provide snow removal during period of Work in the staging and parking areas and on Montée Pont 4.

1.12 ELECTRICITY

.1 Conform to Section 01 51 00 Temporary Utilities for electrical power.

1.13 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

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 11 00 Summary of Work

.2 Section 01 29 00 Payment Procedures

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary controls in order to execute Work expeditiously.

.2 Remove from site all such work after use.

1.3 SECURITY CONSTRUCTION FENCE

.1 Provide secure, temporary construction fences around the work area.

.2 Total amount and location of fences to be approved by the Departmental Representative prior to installation.

.3 Maintain temporary construction fences until the end of the Work or approved by the Departmental Representative.

1.4 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.

1.5 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.

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 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 Departmental Representative. Do not burn waste materials on site.

.3 Clear snow and ice from access road to bridge, bank/pile snow in designated areas only.

.4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.5 Provide on-site containers for collection of waste materials and debris.

.6 Provide and use marked separate bins for recycling.

.7 Dispose of waste materials and debris off site.

.8 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

1.2 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 review remove surplus products, tools, construction machinery and equipment.

.4 Remove waste products and debris.

.5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.

.6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

.7 Install top soil and seeding in damaged areas by the Contractor’s activities. Reinstate the site to a state equivalent or superior to its original condition.

.8 Remove snow and ice from bridge.

.9 Bring back the bridge in a closed position and reopen road to traffic.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

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 03 30 00 Cast-in-Place Concrete.

.2 Section 05 12 33 Structural Steel for Bridges

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Shop Drawings:

.1 Provide shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Provide drawings stamped and signed by professional engineer registered or licensed in the province of Quebec, Canada.

.3 Submit for approval from the Departmental Representative seven days before the start of demolition, a written procedure indicating the methods used to recuperate the debris to prevent the debris from spilling over into waterways or on roads.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling.

1.5 SITE CONDITIONS

.1 Review designated substance report and take precautions to protect environment.

.2 Should material resembling substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.3 Notify Departmental Representative before disrupting access or services.

Part 2 Products

2.1 EQUIPMENT

.1 Concrete demolition:

.1 Use a manual air hammer, maximum weight 15 kg.

.2 Hydrodemolition may be used if it produces results comparable with that of the authorised air hammer.

.3 The Departmental Representative, may, at any time, request that the Contractor reduce the capacity of the demolition tools if it is felt that these may damage the surrounding concrete to remain.

.4 The use of hydraulic hammers is only permitted if the Contractor submits the technical data sheet for approval from the Departmental Representative attesting that the technical characteristics of the hammer are in conformance with the requirements.

.5 Do not use concrete crushers.

.2 Leave equipment and machinery running only while in use, except where extreme temperatures prohibit shutting down.

.3 Demonstrate that tools and machinery are being used in manner which allows for salvage of materials in best condition possible.

Part 3 Execution

3.1 PREPARATION

.1 Do Work in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.2 Protection:

.1 Keep noise and dust to minimum.

.2 Provide temporary dust screens, covers, supports and other protection as required.

.3 Post warning signs on electrical lines and equipment which must remain energized to serve other products during period of demolition.

.4 Locate and protect utility lines. Do not disrupt active or energized utilities designated to remain undisturbed.

3.2 DEMOLITION SALVAGE AND DISPOSAL

.1 Refer to drawings and specifications for items to be salvaged for reuse.

.2 Remove items to be reused, store as directed by Departmental Representative, and re-install.

.3 Mark all items to be reinstalled with durable markings that will enable their reinstatement in the correct locations.

.4 Dispose of removed materials, to appropriate recycling facilities except where specified otherwise, in accordance with authority having jurisdiction.

3.3 CONCRETE DEMOLITION

.1 Concrete to be demolished is indicated on the drawings.

.2 Delimit the areas to be demolished by a saw cut 20mm deep perpendicular to the surface on all surfaces. Reduce the depth of the saw cut to avoid cutting reinforcing steel, if present.

.3 Saw cuts must not cross each other. Concrete demolition where two saw cuts meet must be achieved using a 7 kg manual air hammer.

.4 Employ all necessary precautions to not damage the concrete to remain nor to bend or damage the reinforcing steel to remain, if present.

.5 Replace all reinforcing steel damaged during the Work with a minimum splice length of 600mm. Contractor responsible for the cost to repair damaged reinforcing steel.

.6 All demolition materials become the property of the Contractor.

.7 Frequently clean surfaces during demolition to allow the Departmental Representative to determine if the demolition should be continued deeper.

.8 Operate hammers at an angle between 45° and 60° between the hammer and the surface being demolished.

.9 The Departmental Representative may, at any time, limit the amount of sound concrete to be removed and designate additional surfaces to be removed after the demolition work is complete.

.10 The use of more than one hydraulic hammer within a five metre radius is not permitted.

.11 In the case of hydrodemolition, clean all surfaces to be conserved after hydrodemolition before the surfaces dry. Employ the necessary precautions to not pollute the environment and protect the adjacent properties during hydrodemolition.

.12 Employ the necessary precautions to prevent oils and other substances coming from demolition material to contaminate the concrete to be conserved.

.13 Do not damage other components of the bridge to remain during concrete removal. Repair all damage to the remainder of the bridge caused during removal at no additional cost.

.14 Clean existing concrete stained during the Work.

.15 The time between the demolition and the placement of the new concrete must not exceed two (2) months unless approved by the Departmental Representative in writing.

3.4 STRUCTURAL STEEL DEMOLITION

.1 Structural steel to be removed is indicated on the drawings.

.2 Remove designated structural steel components by carefully removing existing rivets.

.3 Do not damage other components of the bridge to remain during structural steel removal. Repair all damage to the remainder of the bridge caused during removal at no additional cost.

3.5 MECHANICAL COMPONENTS AND SUPPORTS REMOVAL

.1 Mechanical components and supports to be removed are indicated on the drawings.

.2 Mechanical components and supports to be salvaged are indicated on the drawings.

.3 Carefully cut the anchors flush with the concrete surface and remove existing grout.

.4 Do not damage concrete surface during removal. Repair all damage to the concrete caused during removal at no additional cost.

3.6 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction. Eliminate double handling wherever possible.

.4 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.

3.7 REMOVAL FROM SITE

.1 Transport material designated for alternate disposal to approved facilities and in accordance with applicable regulations.

.2 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.8 CLEANING AND RESTORATION

.1 Keep site clean and organized throughout demolition procedure.

.2 Upon completion of project, reinstate areas, parking surfaces and walkways affected by Work to condition which existed prior to beginning of Work.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 20 00 Concrete Reinforcing.

.2 Section 03 30 00 Cast-in-Place Concrete.

1.2 REFERENCES

.1 Cahier des charges et devis généraux (CCDG) 2014 Chapter 15.4 « Ouvrage en béton ».

.2 Canadian Standards Association (CSA International)

.1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.

.3 CSA O121-M1978(R2003), Douglas Fir Plywood.

.4 CSA O151-04, Canadian Softwood Plywood.

.5 CSA O153-M1980(R2003), Poplar Plywood.

.6 CAN/CSA-O325.0-92(R2003), Construction Sheathing.

.7 CSA O437 Series-93(R2006), Standards for OSB and Waferboard.

.8 CAN/CSA-S269.3-M92(R2003), Concrete Formwork, National Standard of Canada

.3 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3 PAYMENT PROCEDURES

.1 Work under this section will not be measured and is included in the work of Section 03 30 00 – Cast-in-Place Concrete.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings for formwork.

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.

.3 Indicate method and schedule of construction and stripping procedures, materials, ties, liners, and locations of temporary embedded parts. Comply with CAN/CSA-S269.3 for formwork drawings.

.4 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling.

.2 Place materials defined as hazardous or toxic in designated containers.

.3 Divert wood materials from landfill to a recycling, reuse or composting facility as approved by Departmental Representative.

.4 Divert plastic materials from landfill to a recycling, reuse or composting facility as approved by Departmental Representative.

.5 Divert unused form release material from landfill to an official hazardous material collections site as approved by the Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Formwork materials:

.1 Use wood and wood product formwork materials to CSA-O121 and CAN/CSA-O86.

.2 Formwork anchor ties: For concrete repairs, use steel formwork ties anchored into the existing concrete.

.1 Minimum 200mm embedment depth into the existing concrete.

.2 Minimum 12mm diameter.

.3 Maximum 600mm horizontal and vertical centre to centre anchor spacing.

.4 Anchors to remain after stripping the forms.

.3 Form liner:

.1 Plywood: medium density overlay Douglas Fir to CSA O121, exterior grade, square edge, minimum 15 mm thick.

.4 Form release agent: Use a non-toxic, biodegradable and low VOC form release oil. The oil shall be non-staining.

Part 3 Execution

3.1 FABRICATION AND ERECTION

.1 Verify lines, levels and centres before proceeding with formwork and ensure dimensions agree with drawings.

.2 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.

.3 Align form joints and make watertight.

.1 Keep form joints to minimum.

.4 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL

.1 Leave formwork in place for a minimum of 3 days after placing concrete.

.2 Re-use formwork subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 03 30 00 Cast-in-Place Concrete

1.2 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment are covered in Section 01 29 00 Payment Procedures.

1.3 REFERENCES

.1 Cahier des charges et devis généraux (CCDG) 2014 Chapter 15.4 « Ouvrage en béton ».

.2 ASTM International

.1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

.2 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.3 CSA International

.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-S6, Canadian Highway Bridge Design Code.

.3 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

.4 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2004, Reinforcing Steel Manual of Standard Practice.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec, Canada.

.1 Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings and locations of reinforcement, with identifying code marks to permit correct placement without reference to structural drawings.

.3 Submit quality control documents as described in PART 2 - SOURCE QUALITY CONTROL.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's 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 in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Departmental Representative.

.2 Reinforcing steel: billet steel, grade 400W, deformed bars to CSA-G30.18, unless indicated otherwise.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and the Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.

.2 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

2.3 SOURCE QUALITY CONTROL

.1 Upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, showing physical and chemical analysis, minimum 2 weeks prior to beginning reinforcing work.

.2 Upon request inform Departmental Representative of proposed source of material to be supplied.

Part 3 Execution

3.1 FIELD BENDING

.1 Do not field bend or field weld reinforcement.

3.2 PLACING REINFORCEMENT

.1 Install reinforcing steel dowels as per Contract Drawings and as per Section 03 30 00 Cast-in-Place Concrete.

.2 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

.3 Ensure cover to reinforcement is maintained during concrete pour.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - 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 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 02 41 16.01 Structure Demolition.

.2 Section 03 10 00 Concrete Forming and Accessories.

.3 Section 03 20 00 Concrete Reinforcing.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Measurement and Payment in accordance with Section 01 29 00 - Payment Procedures.

1.3 REFERENCES

.1 Cahier des charges et devis généraux (CCDG) 2014 Chapter 15.4 « Ouvrages en béton ».

.2 ASTM International

.1 ASTM C260/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C494/C494M-10a, Standard Specification for Chemical Admixtures for Concrete.

.3 ASTM C1017/C1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.3 CSA International

.1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

.2 CSA A283-06, Qualification Code for Concrete Testing Laboratories.

.3 CSA A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: convene pre-installation meeting one (1) week prior to beginning concrete works.

.1 Ensure key personnel attend.

.1 Verify project requirements.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit manufacturer’s product data sheets and mix design for approval by the Departmental Representative.

.3 Concrete pours: 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.

.4 Provide one (1) electronic copy of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.6 QUALITY CONTROL

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

.2 Minimum 2 weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:

.1 Cold weather concrete.

.2 Curing.

.3 Finishes.

.4 Formwork removal.

.3 Quality Control Plan: provide written report to Departmental 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 Store and handle products according to manufacturer's recommendations.

.2 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Concrete repairs:

.1 Type XIV-S in accordance to MTQ standard 3101, 35MPa

.2 Water: to CSA A23.1.

.3 Water for surface preparation: to MTQ standard 3101.

.4 Aggregates: to CSA A23.1/A23.2.

.5 Parging material:

.1 SikaTop 121 PLUS by Sika Canada or equivalent approved by the Departmental Representative.

.2 Parging material shall be on the MTQ list of approved equivalent.

.6 Epoxy adhesive for anchors:

.1 Hit HY 150 MAX by Hilti or equivalent approved by the Departmental Representative.

.2 Epoxy adhesive shall be on the MTQ list of approved products.

.3 Anchor bolt size and type shall be as indicated on the drawings.

.7 Cementitious non-shrink grout:

.1 Sika M-Bed Standard by Sika Canada or equivalent approved by the Departmental Representative.

.2 Non-shrink grout shall be on the MTQ list of approved products.

.8 Admixtures:

.1 Air entraining admixture: to ASTM C260.

.2 Chemical admixture: to ASTM C494 or ASTM C1017. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.

.9 Curing compound shall not be used.

Part 3 Execution

3.1 PREPARATION

.1 Obtain Departmental Representative's written approval before placing concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00 - Concrete Reinforcing.

.3 Pumping of concrete is not required.

.4 Ensure dowels are not disturbed during concrete placement.

.5 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing.

.6 Protect previous Work from staining.

.7 Clean and remove stains prior to application for concrete finishes.

.8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.9 Removal of existing concrete shall be according to section 02 41 16.01 Structure Demolition.

.10 Clean existing concrete surfaces to remain with the use of high pressure water jet or abrasive blast cleaning. Ensure all loose pieces of concrete are removed. Clean the concrete surface by water pressure cleaning (15MPa pressure, 20l/min) prior to placing new concrete.

.11 Abrasive blast clean any exposed reinforcing steel.

.12 Wet the concrete surface prior to installation of new concrete..

.13 In locations where new concrete is dowelled to existing work:

.1 Drill holes in existing concrete and clean the holes with the use of a brush and compressed air. The use of a diamond drill is not allowed unless approved by the Departmental Representative.

.2 Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy adhesive to anchor and hold dowels in positions as indicated on the Contract Drawings. Dowels shall be clean and free of any oil.

.14 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 INSTALLATION/APPLICATION

.1 Perform cast-in-place concrete work to CSA A23.1/A23.2 and CCDG 2014 Chapter 15.4.

.2 Install formwork in accordance with section 03 10 00 Concrete Forming and Accessories.

.3 Anchor bolts:

.1 Remove designated existing anchor bolts in accordance with section 02 41 13 selective site demolition.

.2 Drill holes in existing concrete and clean the holes with the use of a brush and compressed air. The use of a diamond drill is not allowed unless approved by the Departmental Representative.

.3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.

.4 Fill holes with epoxy adhesive and set bolts.

.4 Vibration not required for selected concrete type.

.5 Repair mortar

.1 Apply repair mortar in accordance with manufacturer's written recommendations. Apply a minimum of 3mm of mortar over the entire surface and fill cavities, as such to obtain a uniform surface.

.6 Cementitious grout

.1 Grout under bridge supports, central pivot, rack and balance wheel rail using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.

.7 Finishing:

.1 Finish concrete to CSA A23.1/A23.2 and CCDG 2014 Chapter 15.4.3.5.8.

.2 Use procedures as reviewed by Departmental Representative or those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.

.8 Curing:

.1 According to CCDG 2014 Chapter 15.4.3.5.9.

.9 Install and cure proprietary products according to manufacturer's recommendations.

.10 Fill holes left by removal of formwork with a cementitious grout.

3.3 COLD WEATHER CONCRETING

.1 Cold weather concreting shall be in accordance with CCDG 2014 Chapter 15.4.3.8.

3.4 FIELD QUALITY CONTROL

.1 Verify concrete repair by hitting it with a hammer. If the repair is delaminated, the work must be remove and reinstalled.

.2 Site tests: conduct tests as follows in accordance with Section 01 45 00 - Quality Control, with chapter 15.4.2 of the CCDG 2014, and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.

.1 Concrete pours.

.2 Slump.

.3 Air content.

.4 Compressive strength at 7 and 28 days.

.5 Air and concrete temperature.

3.5 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 09 97 19 Painting Exterior Metal Surfaces

1.2 PRICE AND PAYMENT PROCEDURES

.1 Measurement for payment shall be as per Section 01 29 00 Payment Procedures.

1.3 REFERENCES

.1 Cahier des charges et devis généraux (CCGD) 2014 Chapter 15.7.

.2 ASTM International

.1 ASTM A325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric.

.2 ASTM A490M-09, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints.

.3 CSA International

.1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA S6-06, Canadian Highway Bridge Design Code.

.3 CSA S16-09, Design of Steel Structures.

.4 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding.

.5 CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding).

1.4 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting one week prior to beginning on-site installation, with Departmental Representative to address the following:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other subtrades.

.4 Review written installation instructions and warranty requirements.

.2 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.

.3 Ensure key personnel attend.

.4 Departmental 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 manufacturer's instructions, printed product literature and data sheets for structural steel and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit copies of WHMIS MSDS.

.3 Shop Drawings:

.1 Shop drawings to include, but not limited to:

.1 Shop drawings:

.1 Sizes of all members

.2 Erection marks

.3 Location of shop and field splices

.4 Cuts and copes

.5 Connections, including bolt holes, size and type of bolts

.6 Plates

.7 Materials to be used and identification of the heat number of each part entering in the fabrication of the main girders, primary tension members and other fracture-critical members.

.2 Erection drawings with description of methods, temporary bracing and strengthening, sequence of erection and type of equipment proposed for use in erecting structural steel.

.3 Drawings and calculations of the erection process describing the process to ensure the stability of the structure during the replacement of items of main girders, diaphragms, members or components of open-web girders.

.4 Certificate of calibration of the equipment used to measure the tension of bolts

.5 Bolting procedures

.6 Shop and field welding procedures

.2 Submit drawings stamped and signed by professional engineer registered or licensed in the province of Quebec, Canada.

.3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.

.4 Shop drawings and erection details shall be submitted at least two weeks before the pre-installation meeting.

.5 Fabrication shall not commence until the approved shop drawings have been received.

.4 Provide documents described in PART 2 – SOURCE QUALITY CONTROL and PART 3 - FIELD QUALITY CONTROL.

Part 2 Products

2.1 MATERIALS

.1 Rolled structural steel: to CSA G40.20/G40.21, grade and type 350W. Structural steel shall conform to the MTQ standard 6101.

.2 Structural steel plates: to CSA G40.20/G40.21, grade and type 300W. Structural steel shall conform to the MTQ standard 6101.

.3 High strength bolts, nuts and washers: to ASTM A325M, Type 1. Bolts, nuts and washers shall conform to MTQ standard 6201.

.4 Welding electrodes: to CSA W48 series.

.5 Stud shear connectors: to CSA W59, Clause 5.5.6 and Appendix H and ASTM A 108 (Grade 1015, 1018 or 1020).

2.2 SOURCE QUALITY CONTROL

.1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21 and the Canadian Welding Bureau to the requirements of CSA Standard W47.1 for all welding work. Provide a copy of the steel producer qualifications.

.2 Provide a copy of the fabrication schedule.

.3 Provide a list of individuals involved in the fabrication and their qualification, including staff competency cards performing welds, issued by the Canadian Welding Bureau to the requirements of CSA Standard W47.1.

.4 Provide a manufacturing factory certificate of conformity of structural steel to the Departmental Representative prior to installation for each production batch to confirm the materials are in compliance with the contract documents. The certificate must contain the following information:

.1 Name of steelworks
.2 Date and place of fabrication
.3 Nominal dimensions
.4 Grade
.5 Thermal and energy requirements (Charpy impact test)
.6 Heat number
.7 Results of the analysis and testing
.8 Production lot number

.5 Provide a manufacturing factory certificate of conformity of steel bolts, anchor rods, nuts and washers to the Departmental Representative prior to installation for each production batch to confirm that the chemical composition, mechanical properties and quality of bolts, nuts and washers complies with ASTM A325M. The certificate must contain the following information:

.1 Name of fabricator
.2 Date of fabrication
.3 Identification marking
.4 Nominal dimensions

.5 Steel grade or ASTM designation

.6 Type, grade or alloy

.7 Heat number

.8 Results of the analysis and testing

.9 Coating information

.10 Production lot number of each part (bolts, nuts, washers)

.6 Inspection reports shall be stamped and signed by professional engineer registered or licensed in the province of Quebec, Canada.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of conditions: prior to installation of the structural steel components, 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 Departmental 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 Departmental Representative.

3.2 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.1 Ensure Departmental Representative has delivery schedules 7 days minimum prior to shipping.

.2 Bolts, nuts and washers shall be delivered to the site assembled in a container sealed at the fabricator’s plant.

.2 Storage and Handling Requirements:

.1 Provide protective blocking for lifting, transportation and storing.

.1 Exercise care during fabrication, transportation and erection.

.2 Do not notch edges of members.

.3 Do not cause excessive stresses.

.2 Ensure that no portion of steel comes into contact with ground.

.1 Replace defective or damaged materials with new.

.3 Store nuts, bolts and washers in a safe and dry place free from dust, dirt and humidity until they are installed.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials.

3.3 PREPARATION

.1 Clean steel surfaces of dirt and undesirable deposits to the satisfaction of Departmental Representative when staining or defacing occurs.

.2 Work near river banks or embankments in accordance with written instructions from Departmental Representative.

.3 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.

.4 Prior to steel fabrication, field measure existing steel dimensions to determine the bolt hole locations. New connections are identical to existing assemblies about the dimensions and the number of bolts or rivets; rivets are however replaced by the same diameter bolts.

.5 Envisage that the holes of steel parts are not perfectly aligned when removing rivets to allow the installation of bolts. Drill holes in the field in new parts and enlarge some holes of existing parts to allow the installation of bolts. Enlarge holes by reaming only after receipt of written approval from Departmental Representative. Ensure reamed holes are 2 mm maximum larger than bolt size used.

3.4 FABRICATION AND INSTALLATION

.1 Do not fabricate steel until the shop drawings have been approved by the Departmental Representative.

.2 Fabricate and erect structural steel in accordance with CSA S6 and approved shop drawings.

.3 Ensure a minimum of two support points when lifting beams.

.4 Cutting:

- .1 Flame cut in shop using mechanical guides. The work must be done continuously without stop-start, so as to obtain an even surface.
- .2 Flame cutting is prohibited on the site.
- .3 Remove burrs and deformation by grinding. Round off sharp edges.

.5 Bolted connections:

- .1 Flame drilling is prohibited.
- .2 Bolt holes shall be drilled, reamed or punched in accordance with CAN/CSA-S6 Cl 10.24.4.5.
- .3 Holes made in the field shall be drilled and reamed. Drill the holes with bit to the final diameter with a metal template.
- .4 Remove burrs and other deformations on the edges of holes to allow perfect contact between the parts to be assembled.
- .5 Provide bevelled washers for all connections to the sloped faces of rolled sections.
- .6 Install bolts in accordance with CAN/CSA-S6.
- .7 Use 'turn-of-nut' tightening method. Install all the bolts with a steel washer under the piece (nut or bolt head) that rotates during tightening.
- .8 Bolts shall be long enough to exclude threads from the shear plane.

.9 The threaded end of the bolts must exceed the nut at least 3 mm.

.10 Any bolt loosened after the final tightening has to be replaced with a new bolt.

.6 Allowable tolerance for bolt holes:

.1 Matching holes for 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.

.2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental 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 Correct mispunched or misdrilled members only as directed by Departmental Representative.

.7 Welding:

.1 Do welding in accordance with CSA W59, except where specified otherwise.

.2 Field welding shall be based on the welding process with arc welding (SMAW).

.3 Shear stud welding shall only be done using a welding gun. Manual welding is not permitted.

.4 Preheat the plates to be welded immediately before welding work to eliminate moisture.

.5 Following welding, brush adjacent steel surfaces to remove any splashes and weld spatter that have not adhered firmly to the metal.

.8 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.

.9 Clean steel surfaces that are not galvanised to come in contact with each other during erection according to SSPC-SP6/NACE no.3 “Commercial Blast Cleaning” or SSPC-SP 15 “Commercial Grade Power Tool Cleaning”.

.10 Clean galvanized steel surfaces to come into contact with each other during erection manually with a wire brush in order to remove the glossy appearance without altering the zinc coating.

.11 Recoat existing steel in contact with new steel according to Section 09 97 19 Painting Exterior Metal Surfaces.

.12 Recoat surfaces of new steel damaged during erection according to Section 09 97 19 Painting Exterior Metal Surfaces.

.13 Dimensional tolerances shall be in accordance with CAN/CSA-S6 Cl 10.24.7.

.14 Notify the Departmental Representative of any error which prevents the proper assembly and propose a method of correction. Corrective measures shall not commence until the submitted proposal is accepted.

3.5 FIELD QUALITY CONTROL

.1 Acceptance of bolts:

.1 Perform an acceptance test for bolts subjected to tightening by rotation of the nut.

.2 For each production lot of assembled bolts, inspect in the presence of the Departmental Representative the minimum tension required in at least 3 assembled bolts (bolt, nut and washer) according to the installation conditions provided for in the bolting procedure submitted and proceed in the case of galvanized bolts, with a rotation test on fourth assembled bolt.

.3 Inspect and follow the bolt work by a professional engineer registered or licensed in the province of Quebec, Canada, without any possible delegation. Provide to the Departmental Representative a written and signed notice stating that the tightening of the bolts was performed according to each stage of the bolting procedure submitted.

.2 Welding inspection:

.1 Perform non-destructive examinations on all welds.

.2 Non-destructive testing of welds must be performed by a registered laboratory certified by the Canadian Welding Bureau, according to the requirements of CSA W178.1.

.3 Submit a written and documented inspection report, written by the inspector who executed and interpreted them.

.4 Welding inspection is carried out before repainting surfaces.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - 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 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

.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 05 12 33 Structural Steel for Bridges.

1.2 PRICE AND PAYMENT PROCEDURES

.1 Cleaning of structural steel and components, shop painting and field painting will be included in lump sum bid of structural steel for bridges as indicated in section 01 29 00 Payment Procedures.

1.3 REFERENCES

.1 Cahier des charges et devis généraux (CCDG) 2014 Chapter 15.14 Galvanisation, métallisation et peinturage

.2 Canadian Standards Association (CSA international)

.1 CAN/CSA-S6-06, Canadian Highway Bridge Design Code

.3 American Society for Testing and Materials International:

.1 ASTM D2369 “Standard Test Method for Volatile Content of Coatings”

.2 ASTM D2371 “Standard Test Method for Pigment Content of Solvent Reducible Paints”

.3 ASTM D1475 “Standard Test Method for Density of Liquid Coatings, Inks, and Related Products”

.4 ASTM D562 “Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer Type Viscometer”

.5 ASTM D3359 “Standard Test Method for Measuring Adhesion by Tape Test”

.4 Federal Standard (FS)

.1 FED-STD-595B-89, Colours Used in Government Procurement.

.5 The Society for Protective Coatings (SSPC)

.1 SSPC-SP 1-82(R2004), Solvent Cleaning.

.2 SSPC-SP 11, Power Tool Cleaning to Bare Metal

.3 SSPC-Vis-1-02, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning, 2002 Revision

.4 SSPC-SP 10/NACE No. 2-[07], Near White Blast Cleaning.

.5 SSPC-PA 2 04, Measurement of Dry Coat Thickness with Magnetic Gauges.

.6 SSPC Good Painting Practices, Volume 1, 4th Edition.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit a work plan indicating the environmental protection measures which will be implemented during surface preparation and field painting for approval from the Departmental Representative two weeks before beginning work related to painting.

.3 Product Data:

.1 Submit 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 2 copies of WHMIS MSDS.

.4 Samples:

.1 Submit for review and acceptance of each unit.

.2 Samples will be returned for inclusion into work.

.3 The list of approved paint systems is found on the MTQ website.

.4 Paints that do not appear on MTQ list of approved products must be approved by Departmental Representative before use on project.

.5 Samples shall be submitted in accordance with section 15.14.4.2.3 of the Cahier des charges et devis généraux (CCDG) 2014.

.5 For each paint delivery, submit a document of compliance with the following information to the Departmental Representative:

.1 Name of the manufacturer

.2 Name of the paint

.3 Lot production number

.6 Submit the following test results for each paint delivery. The test values will be verified for conformance with the MTQ requirements:

.1 Non-volatile content (by percentage of mass) according to ASTM D2369

.2 Pigment content (by percentage of mass) according to ASTM D2371

.3 Volumetric mass (kg/l) according to ASTM D1475

.4 Consistency according to ASTM D562

1.5 QUALITY CONTROL AT THE SOURCE

.1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer’s recommendations.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Take all necessary precautions not to damage the coating during transportation and handling.

.4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials.

Part 2 Products

2.1 MATERIALS

.1 Paint:

.1 Coating system: Low Volatile Organic Compound (VOC) epoxy zinc/epoxy/polyurethane

.2 Select zinc based coating system in accordance with the MTQ standards 10102.

.3 Select a paint system on the MTQ list of approved products.

.4 Match paint colour to existing structure.

.2 Sand for sandblasting: to SSPC (Steel Structures Painting Council).

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 Departmental Representative.

.2 Carry out tests to determine existence of lead base paint on existing exterior metal surfaces.

.3 If lead exists stop work and report findings to Departmental Representative.

.4 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.5 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 ENVIRONMENTAL PROTECTION

.1 Treat paint residues from blast cleaning as hazardous waste. The age of the existing bridge indicates the likelihood of lead based paint.

.2 A full enclosure with a negative pressure system must be used during abrasive blast cleaning of structural steel and the application of paint by spraying.

.3 Submit details of the enclosure for approval from the Departmental Representative at least two weeks before beginning surface preparation. Enclosure must consist of tarps, scaffolding and a floor in order to collect all generated residues. The enclosure details must be signed and sealed by an engineer licensed in the province of Quebec. The purpose of the review by the Departmental Representative is to verify the loads applied to the bridge only and not the design of the enclosure itself.

.4 Install the enclosure prior to beginning surface preparation activities. An engineer licensed in the province of Quebec must inspect the enclosure and provide a signed and sealed letter certifying the enclosure was built according to the plans. A signed and sealed letter must be provided anytime the enclosure is moved.

.5 Enclosures must be waterproof. The tarps must be adequately reinforced to prevent tearing or displacement due to construction and wind loads and all other environmental effects.

.6 Provide lighting within the enclosure.

.7 If winds are too high for the debris to be confined within the enclosure, temporarily cease surface preparation or spray painting.

.8 Prevent any dust from leaving the enclosure during the dismantling of the enclosure. Vacuum all enclosure surfaces prior to moving or dismantling the enclosure.

.9 Remove all residue generated during surface preparation prior to beginning painting.

.10 Collect all paint residues and temporarily store on site in air tight containers.

.11 Dispose of hazardous waste at a disposal site approved by the ministère du Développement durable, de l'Environnement, de la Faune et des Parcs.

.12 Transportation of hazardous waste must be carried out by the holder of a permit to transport hazardous materials.

3.3 PREPARATION

.1 New metal surfaces:

- .1 Remove all grease and oil in accordance with SSPC-SP1 "Solvent Cleaning"
- .2 Abrasive blast clean steel in accordance with SSPC-SP1/ NACE No. 2 "Near White Blast Cleaning".
- .3 Degree of cleanliness of the surface prepared steel to be in accordance with SSPC-Vis-1 "Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning".

.2 Existing metal surfaces to be repainted:

- .1 Remove all grease and oil in accordance with SSPC-SP1 "Solvent Cleaning".
- .2 Abrasive blast clean steel in accordance with SSPC-SP1/ NACE No. 2 "Near White Blast Cleaning".
- .3 Clean steel surfaces inaccessible by abrasive blast cleaning in accordance with SSPC-SP11 "Power Tool Cleaning to Bare Metal".
- .4 Degree of cleanliness of the surface prepared steel to be in accordance with SSPC-Vis-1 "Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning".

.3 Compressed air to be free of water and oil before reaching nozzle.

.4 Remove traces of blast products from surfaces, pockets and corners to be painted by blowing with clean dry compressed air or by vacuum cleaning.

.5 Apply paint only after prepared surfaces have been accepted by Departmental Representative.

.6 Prepared surface must be free of all dust and humidity.

.7 Clean surfaces again if rusting occurs after completion of surface preparation.

.8 Mixing paint:

.1 Do not dilute or thin paint for brush application.

.2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.

.3 Do not mix or keep paint in suspension by means of air bubbling through paint.

.4 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 Departmental Representative.

3.4 APPLICATION

.1 Coat steel with first coat of paint as soon as possible after the surface preparation is complete and before the appearance of rust. Apply first coat of paint no more than 8 hours after the surface preparation.

.2 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.3 Use dipping or roller coating method of application when specifically authorized by Departmental Representative in writing.

.4 Apply the final coat of paint according to the manufacturer’s recommendations without exceeding a maximum of 7 days after applying the first coat of paint.

.5 Only apply paint when:

.1 Air temperature and surface temperature are above 5 °C.

.2 Surface temperature exceeds the dew point by at least 3 °C.

.3 Temperature of surface is below 50 °C unless paint is specifically formulated for application at high temperatures.

.4 There is no fog or mist at site; it is not raining or snowing; there is no danger of rain or snow; relative humidity is below 85%.

.5 Surface to be painted is dry.

.6 Previous coat is dry.

.6 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.

.7 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.

.8 Prior to installing the first two paints of the coating system, brush paint the rivets, non-galvanized nuts and bolts, and the seams between assembled fittings using the same coating system.

.9 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.10 Apply coating thicknesses in accordance with manufacturer’s specifications and MTQ standard 10102.

.11 Spray application:

.1 Apply paint by spraying. Brush paint areas which cannot be painted by spraying.

.2 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.

.3 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.

.4 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary. Follow manufacturer's specifications.

.5 Apply paint in uniform layer, with overlapping at edges of spray pattern.

.6 Brush out immediately runs and sags.

.7 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.

.8 Remove runs, sags and brush marks from finished work and repaint.

.12 Brush application:

.1 Work paint into cracks, crevices and corners.

.2 Brush out runs and sags.

.3 Remove runs, sags and brush marks from finished work and repaint.

.13 Shop painting:

.1 Do shop painting for new structural steel.

.2 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.

.3 Spray paint contact surfaces of field assembled, bolted, friction type joints with primer coat only. Do not brush primer after spraying.

.4 Paint metal surfaces to be in contact with wood with either full paint coats specified or three shop coats of specified primer.

.5 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 Departmental Representative.

.6 Copy previous erection marks and weight marks on areas that have been shop painted.

.14 Field painting:

.1 Paint steel structures as soon as practical after erection.

.2 Field paint non-galvanized nuts, bolts and washers with all paint in the coating system.

.3 Field paint surfaces (other than joint contact surfaces) which are accessible before erection but which are not to be accessible after erection.

.4 Where painting does not meet with requirements of specifications, and when so directed by Departmental Representative, remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.

.5 Use the same paint system for field painting as shop painting. The final coat must be the same colour as that used for shop painting.

.15 Touch ups:

.1 Take the necessary precautions to minimize the amount of touch ups.

.2 Remove all damaged paint and all other contaminants prior to carrying out the touch ups.

.3 Touch up each damaged coating using the same paint system and at the thickness specified by the manufacturer.

.4 Touch up existing painted surfaced damaged during the work using the following procedure:

.1 Prepare surfaces by abrasive blast cleaning according to SSPC-SP 6/NACE no 3 or using power tools according to SSPC-SP 15.

.2 Remove all dust and residues.

.3 Carry out touch ups using a moist curing polyurethane paint system conforming to the following:

.1 Primer: polyurethane paint with aluminum pigments.

.2 Final coat: polyurethane paint. Paint colour to match existing.

.3 Minimum final thickness: 150 μm.

.16 Handling painted metal:

.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.

3.5 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.

.2 The paint film must have a minimum adhesion of 3A according to “Test Method A – X Cut Tape Test” as described in ASTM D3359.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 PROTECTION

.1 Protect painted surfaces from damage during construction.

.2 Protection of surfaces:

.1 Protect surfaces not to receive paint.

.2 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.

.3 Protect cleaned and freshly painted surfaces from dust to approval of Departmental Representative.

.3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES AND PAYMENT

.1 Topsoil placement and grading, including any testing, will not be measured for payment. It is included in the lump sum bid for the final cleanup as indicated in section 01 29 00 Payment Procedures. The cost includes all work required for restoration of the site where the grass has been damaged.

1.2 REFERENCES

.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998.

.2 Canadian Council of Ministers of the Environment

.1 PN1340-[2005], Guidelines for Compost Quality.

.3 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.3 DEFINITIONS

.1 Compost:

.1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.

.2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.

.3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminates.

.4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Quality control submittals :

.1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2 - SOURCE QUALITY CONTROL.

.2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 QUALITY ASSURANCE

.1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse or recycling.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 TOPSOIL

.1 Topsoil for seeded areas: mixture of particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.

- .1 Soil texture based on The Canadian System of Soil Classification, to consist of [20] to [70] % sand, minimum [7] % clay, and contain [2] to [10] % organic matter by weight.
- .2 Contain no toxic elements or growth inhibiting materials.
- .3 Finished surface free from:
  - .1 Debris and stones over 50 mm diameter.
  - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
- .4 Consistence: friable when moist.

2.2 SOURCE QUALITY CONTROL

.1 Advise Departmental Representative of sources of topsoil to be utilized with sufficient lead time for testing.

.2 Contractor is responsible for amendments to supply topsoil as specified.

.3 Soil testing by recognized testing facility for PH, P and K, and organic matter.

.4 Testing of topsoil will be carried out by testing laboratory designated by the Contractor.

- .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

Part 3 Execution

3.1 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 and sediment and erosion control plan, specific to site.

.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.

3.2 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of grasses and weeds and removed from site.

.2 Strip topsoil to depths as directed by Departmental Representative.

.1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Departmental Representative.

.1 Stockpile height not to exceed [2] m.

.4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill.

.5 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

.1 Verify that grades are correct.

.1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.

.2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.3 Remove debris, roots, branches, stones in excess of [50] mm diameter and other deleterious materials.

.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

.2 Remove debris which protrudes more than [75] mm above surface.

.3 Dispose of removed material off site.

.4 Cultivate entire area which is to receive topsoil to minimum depth of [100] mm.

.1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 PLACING AND SPREADING OF TOPSOIL

.1 Place topsoil after Departmental Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 Spread topsoil as indicated to following minimum depths after settlement.

.1 [150] mm for seeded areas.

.4 Manually spread topsoil around trees, shrubs and obstacles.

3.5 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.

.1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.

.1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.6 ACCEPTANCE

.1 Departmental Representative will inspect topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

.1 Dispose of materials off site.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 MEASUREMENT AND PAYMENT

.1 No measurement for payment for seeding will be made. It is included in the lump sum bid for the final cleanup as indicated in section 01 29 00 Payment Procedures. The cost includes all work required for restoration of the site where the grass has been damaged.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:

.1 Schedule sod laying to coincide with preparation of soil surface.

.2 Schedule sod installation when frost is not present in ground.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

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 seed, and fertilizer.

.2 Submit [2] copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.

.3 Samples:

.1 Submit [0.5] kg container of each type of fertilizer used.

.4 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.5 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

1.4 QUALITY CONTROL

.1 Qualifications:

.1 Landscape Contractor: to be a Member in Good Standing of Horticultural Trades Association.

.2 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape Installation designation.

.3 Landscape Maintenance Supervisor: Landscape Industry Certified Technician with Turf Maintenance designation.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:

.1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.

.2 Fertilizer must be dry.

.3 Storage and Handling Requirements:

.1 Store fertilizer 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 Develop Construction Waste Management Plan related to Work of this Section.

.5 Packaging Waste Management: remove for reuse as specified in Construction Waste Management Plan.

1.6 WARRANTY

.1 For seeding, 12 months warranty period is extended to 1 full growing season.

.2 Contractor hereby warrants that seeding will remain free of defects for 1 full growing season.

.3 End-of-warranty inspection will be conducted by Departmental Representative.

Part 2 Products

2.1 GRASS SEED

.1 Canada "Certified" seed, "Canada No. 1 Lawn Grass Mixture" in accordance with Government of Canada "Seeds Act" and "Seeds Regulations".

.1 Grass seed mixture.

.1 Mixture composition:

.1 50 % creeping red fescue (Festuca rubra).

.2 30 % Kentucky bluegrass (Poa pratensis).

.3 10 % Common Bent grass (Agrostis capillaris).

.4 10 % Redtop (Agrostis gigantean).

.5 10 % perennial rye-grass (Lolium perenne).

.2 In packages individually labelled in accordance with "Seeds Regulations" and indicating name of supplier.

2.2 WATER

.1 Free of impurities that would inhibit germination and growth.

.2 Supply water for required irrigation.

2.3 FERTILIZER

.1 To Canada "Fertilizers Act" and Regulations.

.2 Complete synthetic fertilizer with guaranteed minimum analysis as specified.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for mechanical seeding installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental 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 Departmental Representative.

3.2 INSTALLERS

.1 Use installers' members in Good Standing of Horticultural Trades Association.

3.3 SEED BED PREPARATION

.1 Do not perform work under adverse field conditions as determined by Departmental Representative.

.2 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; to a licensed contaminated soils disposal site.

.3 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and commence work when instructed by Departmental Representative.

.4 Fine grade surface free of humps and hollows to smooth, even grade, to contours to tolerance of plus or minus [15] mm, surface draining naturally.

.5 Cultivate fine graded surface approved by Departmental Representative to [25] mm depth immediately prior to seeding.

3.4 SEED PLACEMENT

.1 Ensure seed is placed under supervision of certified Landscape Planting Supervisor.

.2 For mechanical seeding:

.1 Mechanical landscape drill seeder ("Brillion" type or equivalent) which accurately places seed at specified depth and rate and rolls in single operation.

.2 Use equipment and method acceptable to Departmental Representative.

.3 For manual seeding:

.1 Use manually operated drop seeder ("Cyclone" type or equivalent).

.2 Use manually operated, water ballast, landscaping type, smooth steel drum roller. Ballast as directed by Departmental Representative.

.3 Use equipment and method acceptable to Departmental Representative.

.4 Blend applications [150] mm into adjacent grass areas to form uniform surfaces.

.5 Sow half of required amount of seed in one direction and remainder at right angles as applicable.

.6 Incorporate seed by light raking in cross directions.

.7 Consolidate mechanically seeded areas by rolling area if soil conditions warrant or if directed by Departmental Representative with equipment approved by Departmental Representative immediately after seeding.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.1 Clean and reinstate areas affected by Work.

.3 Waste Management: separate waste materials for reuse and recycling.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

.2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

3.6 PROTECTION

.1 Erect protection around newly seeded areas sufficient to protect against deterioration due to pedestrian or other traffic, where not in interference with the movement of the swing bridge.

3.7 FERTILIZING PROGRAM

.1 Fertilize during establishment and warranty periods to following program:

Date Range	Date		Date	Application Rate	Formulation (NPK Ratio)
Between	Beginning of spring	and	September 15	125 kg/ ha	1-3-1

3.8 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Ensure maintenance is carried out under supervision of certified Landscape Maintenance Supervisor.

.2 Perform following operations from time of seed application until acceptance by Departmental Representative:

.1 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.

.2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.

.3 Cut grass to [50] mm whenever it reaches height of [70] mm. Remove clippings which will smother grass as directed by Departmental Representative.

.4 Fertilize seeded areas after first cutting in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

.5 Control weeds by mechanical means utilizing acceptable integrated pest management practices.

.1 Chemical means are not permitted.

.6 Adjust protection barrier as necessary to protect against deterioration due to pedestrian or other traffic as needed.

3.9 FINAL ACCEPTANCE

.1 Seeded areas will be accepted by Departmental Representative provided that:

.1 Areas are uniformly established free of rutted, eroded, bare or dead spots and extent of weeds apparent in grass is acceptable.

.2 Areas have been cut at least twice.

.3 Areas have been fertilized.

.2 Areas seeded in fall will be accepted in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.10 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period.

.1 Water seeded area to maintain optimum soil moisture level for continued growth of grass. Control watering to prevent washouts.

.2 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.

.3 Cut grass to [50] mm whenever it reaches height of [70] mm. Remove clippings which will smother grass as directed by Departmental Representative.

.4 Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

.5 Control weeds by mechanical means utilizing acceptable integrated pest management practices.

.1 Chemical means are not permitted.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 The Contractor is responsible for the design of the jacking and temporary support system.

.3 Bridge deck jacking and temporary support system must be designed by a professional engineer licensed in the province of Quebec.

.4 Submit one electronic copy of each of the jacking and temporary support drawings and calculations to the Departmental Representative for approval at least three (3) weeks prior to the commencement of the jacking operations.

.5 The drawings and calculations must be signed and sealed by a professional engineer licensed in the province of Quebec.

.6 Bridge deck jacking drawings and calculations shall include the following:

- .1 Jacking methodology and sequence.
- .2 Location and capacity of the jacks to be used.
- .3 Description of the control system, complete with all design, schematics and equipment to be used.
- .4 Location and material to be used for temporary blocking and shimming.
- .5 Schematic showing the configuration of all jacks, stop valves, gauges, manifolds and hydraulic pumps.
- .6 Current calibration certificates for all jacks and gauges.
- .7 Full details of the temporary support system including forces to be transmitted and method of transferring the loads to the founding strata.
- .8 Strengthening of the existing structure, if necessary.

.7 Keep a copy of the signed and sealed jacking and temporary support drawings on site.

.8 When amendments to the jacking and support drawings are required, submit revised drawings and calculations.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 PRE-CONSTRUCTION SURVEY

.1 Inspect the existing superstructure prior to jacking the bridge to ensure the steel beams at the lifting points do not exhibit significant rust or deterioration and that there are no

perforations in the steel. Account for deterioration during the design of jacking and temporary support.

.2 Ensure the jacking beams are capable of supporting the bridge deck at the jacking point locations. Reinforce the jacking beams if required. Jacking loads are indicated on the drawings.

.3 Carry out field measurements of all components of the existing structure that might impact the installation of the temporary supports and ensure that the jacking drawings and calculations are adjusted accordingly.

3.2 JACKING

.1 Prior to jacking the bridge, ensure the bridge is in the open position.

.2 Inform the Departmental Representative at least three (3) days prior to the commencement of the jacking operations.

.3 Jacking operations must be carried out under the direct supervision of the jacking and temporary support design engineer.

.4 Ensure nothing is preventing the vertical movement of the bridge prior to jacking the bridge.

.5 Only place jacks at the jacking points indicated on the drawings.

.6 The rated capacity of the jacks must not be less than 150% of the reaction load specified on the drawings.

.7 Ensure the installation of the lifting equipment is in conformance with the jacking drawings.

.8 Ensure the bridge deck is always lifted uniformly. Monitor the lift at each jacking point continuously during the jacking operation.

.9 Install the temporary supports and shims as the bridge deck is being lifted to limit a possible collapse to a maximum of 3mm in the case of jack failure.

.10 Do not damage the bridge during jacking and installation temporary supports. Repair all damage to the bridge at no additional cost.

.11 Protect the existing electrical conduit during the bridge deck jacking.

3.3 TEMPORARY SUPPORTS

.1 Do not support the bridge deck on jacks.

.2 Provide lateral restraint to the bridge deck.

.3 The temporary support measures must be inspected by the professional engineer who designed them. Work on the bridge deck may not proceed until the professional engineer issues written approval that the temporary support measures are in accordance with the submitted drawings to the Contractor and the Departmental Representative.

.4 Lower the jacks in one synchronized operation to support the bridge deck on the temporary supports.

.5 Do not make any changes to the temporary support measures without written approval from the professional engineer who designed them.

3.4 LOWERING OF THE SUPERSTRUCTURE

.1 Upon completion of the Work requiring jacking of the bridge deck, jack the bridge as required to remove the shims.

.2 Lower the bridge deck in one synchronized operation to its final position. Remove temporary supports during the lowering of the bridge deck to allow for a maximum collapse of the bridge deck of 3mm in the case of jack failure.

.3 Ensure proper contact between the bridge deck and the central bearing prior to removing the jacks.

.4 Remove all jacking equipment.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 The Mechanical Work is shown on sheets M01 through M05 of the Contract Plans and as detailed in these Specifications. The mechanical work includes removal and replacement of the center bearing, the removal and re-installation of the balance wheel assemblies and balance wheel rail, the removal and re-installation of the rack segments, removal and re-installation of the west end caster strike plates, and removal and replacement of damaged rack section(s). The work also includes survey work, balance work, and other work incidental to the above tasks, as identified in these specifications and as shown on the mechanical sheets.

.2 Coordinate the mechanical work with all other work items as necessary to produce completed systems which meet the requirements of the Contract Documents.

.3 This work includes furnishing all labor, materials, tools, services and equipment required to perform the removal, installation, adjustment, lubrication and testing of the mechanical machinery shown on the Contract Drawings and as indicated herein.

1.2 LIMITS OF WORK

.1 The limits of work included for this section are as indicated on drawings M01 to M05 of the Contract Drawings and as specified herein.

1.3 STANDARDS

.1 All new machinery items must meet the requirements of the National Standard of Canada CAN/CSA-S6-06 Canadian Highway Bridge Design Code, hereinafter referred to as CHBDC, unless otherwise noted.

.2 Standards referred to in the Contract Documents are published by the following organizations and are directly applicable to the material and workmanship required by this item.

.1 ASTM - American Soc. for Testing & Materials

.2 ANSI - American National Standards Institute

.3 CSA - Canadian Standards Association

.4 AWS - American Welding Society.

.5 SSPC - The Society for Protective Coatings.

.6 AGMA – American Gear Manufacturers Assoc.

.7 ABMA – American Bearing Manufacturer’s Assoc.

1.4 SUBSTITUTIONS

.1 Items specified by manufacturer name or part number on the Contract Plans may be replaced by an equivalent item by another manufacturer, subject to approval by the Departmental Representative , with the understanding that all changes required by the substitution are made at no additional cost. Item equivalency shall be determined at the sole discretion of the Departmental Representative and may be based on one or more of the following: quality, function, ease of maintenance, physical size, reliability, value,

load capacity (static and dynamic), durability, availability and other criteria as deemed appropriate by the Departmental Representative.

1.5 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 the Departmental Representative of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

1.6 ADMINISTRATIVE

.1 Submit to the Departmental Representative submittals listed for review. Submit 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.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock ups in SI Metric units.

.4 Where items or information is not produced in SI Metric units converted values are acceptable.

.5 Review submittals prior to submission to the Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.7 Verify field measurements and affected adjacent Work is coordinated.

.8 Contractor's responsibility for errors and omissions in submission is not relieved by the Departmental Representative's review of submittals.

.9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by the Departmental Representative's review.

.10 Keep one reviewed copy of each submission on site.

1.7 DIMENSIONS/ CERTIFIED DRAWINGS

.1 Dimensions indicated on the Contract Drawings are nominal and intended for information. Many of the dimensions indicated on the Contract Drawings have been obtained from existing drawings or from information provided by various machinery manufacturers. The dimensions have not been field verified or obtained from certified drawings from the various manufacturers. All dimensions indicated on the Contract Drawings must be verified in the field or from certified drawings from the various machinery manufacturers by the Contractor. Note field verified dimensions on the shop drawings.

.2 Notify the Departmental Representative of any dimensional deviations found during the verification. Make all required field measurements and obtain certified dimensions for all manufactured products necessary before proceeding with shop drawings, fabrication, and

installation. The Contractor is solely responsible for converting dimensions from metric to Imperial units, or vice versa, as required.

1.8 SUBMITTALS

.1 Submit required documents, including shop drawings, erection drawings, machinery installation procedures, final record drawings, and other required submittals specified herein, in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit initial survey results prior to making any changes to the span or the machinery.

.3 Submit intermediate survey results prior to final grouting of the center bearing, balance wheel rail, or the rack segments.

.4 Submit final survey results after final grouting of the center bearing, balance wheel rail, and the rack segments.

.5 Submit complete drawing packages for all mechanical machinery system submittals as follows:

.1 Center Bearing Assembly

.2 Span Drive Rack Assembly

.3 Balance Wheel and Balance Wheel Rail Adjustment Details

.4 A summary of closed position span elevations, roadway gaps, and caster deflections based on initial survey measurements.

.6 Any submittals that do not contain all documents required for the manufacture, assembly and erection of the machinery systems will be returned without review.

1.9 SHOP DRAWINGS AND PRODUCT DATA

.1 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.

.2 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.

.3 Provide a detailed shop drawing submittal schedule to the Departmental Representative within 30 days of the "Notice to Proceed".

.4 Draw all shop drawings to scale and provide the scale on the drawings. Ensure that details of a given part are clearly visible at the scale selected for that part with the exception that enlarged views of small details within a part may be used to improve clarity and prevent excessively large drawings.

.5 Indicate materials, methods of construction and attachment or anchorage, connections, schedules for fabrication, shop assembly procedures, diagrams showing sequence and details for erection, 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 coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.6 Identify conflicts between manufacturers' instructions and Contract Documents and submit resolution for review and approval.

.7 Identify variations between Contract Documents and product or system limitations that may be detrimental to the successful performance of the completed work.

.8 Submit copies of producer or manufacturer data. This includes specifications, tests and installation instructions for the following items, but not excluding other items or materials not specifically mentioned.

.1 Mill reports and physical tests of all metals

.2 Bolts, nuts, washers and other fasteners

.3 Paint

.4 Lubricants

.5 .5 Standard stocked items

.6 Center spherical roller bearing

.9 Allow 30 days for the Departmental Representative's review of each submission.

.10 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to the Departmental Representative prior to proceeding with Work.

.11 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.12 Accompany submissions with transmittal letter containing:

.1 Date

.2 Project title and number

.3 Contractor's name and address

.4 Identification and quantity of each shop drawing, product data and sample

.5 A sequential number - number resubmittals with the original submittal number and an alphabetic suffix

.6 Other pertinent data

.13 Submissions include

.1 Date and revision dates

.2 Project title and number

.3 Name and address of:

.1 Subcontractor

.2 Supplier

.3 Manufacturer

.4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.

.5 A complete shop bill of materials for all machinery parts.

.6 Details of appropriate portions of Work as applicable:

.1 Fabrication

.2 Layout, showing dimensions, including identified field dimensions, and clearances

.3 Setting or erection details

.4 Capacities

.5 Performance characteristics

.6 Standards

.7 Operating weight

.8 Relationship to adjacent work

.9 Instructions for painting the machinery

.10 All appropriate weld symbols along with stress relieving process for weldments

.11 The surface finish of machined surfaces and tolerances for each dimension for which a specific fit is required. Fits and finishes per CHBDC section 13.8.20.2, unless otherwise required by the product manufacturer

.12 Dimension and provide tolerances for all parts to ensure that components of a common purpose that are fabricated from the same detail are interchangeable

.13 Tolerances for all drawing dimensions, either directly or via a standard title block, as necessary to obtain proper fit and function of assembled components

.14 The required tension, method of tightening and all other pertinent information for all machinery connection bolts

.7 Proprietary parts shown in outline on the drawings with sufficient dimensions and data to determine the clearances required for installation and operation.

.8 Certified dimension prints from equipment manufacturers stating pertinent ratings of the equipment, and indicating, when applicable, provisions for adding, draining, and checking the lubricant, method of lubrication, amount and type of lubricant required and type of fittings, the location of inspection openings and the location and type of venting devices.

.9 Provide complete assembly and erection drawings. Provide identifying marks and essential dimensions for locating each part or assembled unit with respect to the bridge or equipment foundation. For each part, provide cross references to the sheet on which it is detailed. Contract Plans will not be considered a substitute for assembly or erection drawings.

.10 Indicate on the shop drawings, for review by the Departmental Representative, the type of tightening, type of wrench and the value of torque or other pertinent information of all connection bolts for all items and machinery.

.14 After the Departmental Representative's review, distribute copies.

.15 Submit electronic copies of product data sheets or brochures for requirements requested in the specifications where shop drawings will not be prepared due to standardized manufacture of product.

.16 Submit electronic copies of test reports for requirements requested in the specifications and as requested by the Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.17 Submit electronic copies of certificates for requirements requested in the specifications and as requested by the Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.18 Submit electronic copies of manufacturers' instructions for requirements requested in specification Sections and as requested by the Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.19 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by the Departmental Representative.

.20 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.21 Submit electronic copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by the Departmental Representative.

.22 Delete or otherwise mark-up to exclude information not applicable to project.

.23 Supplement standard information to provide details applicable to project.

.24 If upon review by the Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, approved electronic documents will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

1.10 MACHINERY INSTALLATION PROCEDURE

.1 Prepare a detailed written installation procedure for the installation of all mechanical machinery. Include sequence of installation, alignment methods, bolt tightening methods and required tension values for all bolts. Include resumes for all supervising engineers and millwrights associated with machinery installation and alignment with the written installation procedure.

.2 Demonstrate to the Departmental Representative that the Contractor has full knowledge of machinery connections and alignment procedures and that the work will be performed by qualified millwrights.

.3 Begin installation of the machinery after the procedures and resumes have been submitted by the Contractor and they are satisfactory in the sole opinion of the Departmental Representative. Correct and resubmit the procedure and/or submit resumes for alternate

personnel as necessary to the satisfaction of the Departmental Representative. This resubmission procedure, if required, is not cause for delay.

.4 Ship machinery items to the job site after the Contractor has submitted a satisfactory installation procedure.

1.11 FINAL RECORD DRAWINGS ("AS-BUILT"DRAWINGS)

.1 Submit reproducible hard copies of drawings of all materials as fabricated following fabrication. Clearly indicate any deviations from the approved shop drawings. Make reproducible drawings using the Department's standard title block. Stamp these drawings "As Built", immediately above the title block. Also provide an electronic copy in portable document format (PDF).

1.12 MAINTENANCE AND LUBRICATION MANUAL

.1 Provide a limited manual with a summary of maintenance details related to this rehabilitation. Provide the following:

.1 Center bearing manufacturer's literature describing the equipment and giving manufacturer's model number and drawing number.

.2 Schematics that show the lubrication locations and the type and frequency of lubrication at the center bearing.

.3 Copies of all warranties on equipment supplied to the project. For each item of work defined in this specification, provided with a warranty.

.4 List of nearest local suppliers of all equipment parts for the center bearing.

.5 Name, address, and telephone number of the local manufacturer's representative for the center bearing so that pieces or spare parts can easily be obtained.

.2 Submit six preliminary copies of the manual prior to shipment of machinery to the site. Complete the preliminary manual in all respects with regard to material content, organization and legibility for review by the Departmental Representative. Preliminary copies need not comply with presentation requirements including size, paper weight, paper reinforcement and protection including oil, moisture and wear resistant covers, and copy method.

.3 Preliminary copies will be reviewed and the changes made will be incorporated in to the final manual. Submit six final copies of the manual after the machinery is in operation. Incorporate into the final manual the Departmental Representative's comments on the preliminary manual and all field changes made during construction and installation. Ensure permanence of the manuals by complying with all presentation requirements.

.4 Provide an electronic copy of the final manual in Portable Document Format (PDF).

.5 Furnish manufacturer's operating and maintenance manuals giving complete instructions relative to assembly, installation, operation, adjustment, lubrication, maintenance, and carrying complete parts lists for every item of equipment furnished by Contractor.

.6 Manuals may be manufacturer's standard publications provided that they comply with specified requirements relative to quantity and quality of information and data.

.7 Neatly imprint the cover and title page with a descriptive title and that contain the name of the bridge, owner, and location. Include on the title page the names of the Departmental Representative, the Contractor, and the date of issue. Separate the various

sections which comprise the manual with divider pages. All parts information must be correct for the equipment provided under this Contract. Modify standard parts drawings to be suitable and block out irrelevant material. Modify all general information used as necessary to show pertinence to the equipment furnished under this Contract, and remove irrelevant material. Submit the arrangement of the manual, method of binding, including material and text to the Department Representative for approval.

.8 Illustrations must be clear. Printed matter, including dimensions and lettering on drawings, must be easily legible. If reduced drawings are incorporated into the manuals, darken the original lines and letters if necessary to retain their legibility after reduction. Larger drawings may folded into manuals to page size. Reproduce diagrams and prints used in the manual to a size less than 280 mm by 432 mm. Include diagrams on white paper and vacuum seal in transparent plastic material impervious to moisture and oil, and resistant to abrasion. Other formats which are equal in clarity, sharpness, durability and permanence will be considered.

.9 Prepare the manuals from the following materials:

.1 Tear, water, and grease resistant paper.

.2 Page size, 216 mm by 279 mm

.3 Fold out diagrams and illustrations.

.4 Reproducible by dry copy xerography method.

.5 Oil, moisture and wear resistant hard or flexible plastic covers.

.10 Provide the Departmental Representative with a center bearing lubrication plan for approval. Develop the plan from recommendations made by the bearing manufacturer and in accordance with the requirements of section 2.4, Lubrication.

Part 2 PRODUCTS

2.1 GENERAL MATERIAL AND WORKMANSHIP

.1 All materials shall be new and conform to ASTM standards and other standards listed in these Specifications and on the Contract Plans, unless noted otherwise.

.2 Supply materials from manufacturers who have manufactured similar materials for similar applications for a period of not less than ten years

.3 Perform Brinell or Rockwell hardness testing and provide results on inspection reports for all materials for which hardness values are required on the Contract Plans, in the material specifications, or specified herein.

.4 Do not fabricate, machine, weld, cast or forge items without a minimum of three weeks advance notification to the Departmental Representative to permit scheduling of required inspection. Furnish all facilities and provide for free access at the plant or shop for the inspection of materials and workmanship, and to witness shop tests. The inspector has the authority to recommend to the Departmental Representative rejection of material or workmanship that does not meet the requirements of the Contract Documents. The Departmental Representative shall make the final decision for rejection.

.5 Furnish the Departmental Representative with the number of unpriced copies of purchase orders as may be required for scheduling tests as outlined in this Specifications.

.6 Unless otherwise provided, furnish without charge, test specimens required herein, and all labor, testing machines, tools and equipment necessary to prepare the specimens and to make the physical tests and chemical analyses. Submit copies of test reports and various tests to the Departmental Representative.

2.2 FASTENERS

.1 Bolts smaller than 1 1/2 in. [38 mm]: high strength heavy hex bolts made from material equal to ASTM A325M unless otherwise specified on the Contract Drawings.

.2 Bolts greater than 1 1/2 in. [38 mm]: made from material equal to ASTM A449-07b.

.3 All bolts: conform to the United Thread Standards, coarse thread series, for threads on bolts, nuts, and cap screws with a Class 2A tolerance for bolts and Class 2B tolerance for nuts, in accordance with ANSI/ASME N1.1-2003, unless otherwise specified. Bolt head and nut bearing surface must be flat and square with the axis of the bolts holes. Spot face as necessary to produce no less than 80% contact between mating surfaces.

.4 Turned bolts are called out by nominal thread diameter on the Contract Plans. Make the bodies of turned bolts 63 microinch finish or finer, and as defined by CHBDC 13.8.17.8, unless noted otherwise on the Contract Plans. Make turned bolt body diameters 1.6 mm larger than thread diameter unless noted otherwise on the Contract Plans. For turned bolts, provide standard hex heads for bolts of the next nominal size larger than the thread diameter or heavy hex heads for the nominal thread diameter, unless noted otherwise on the Contract Plans. Unless otherwise noted, bolt holes in machinery parts required for connecting to supporting steel may be sub-drilled (in the shop) smaller than the turned bolt diameter and must be rearmed together with supporting structural steel either during assembly or at erection to provide an LC6 fit, after the parts are correctly assembled and aligned.

.5 Hex socket head cap screws: ASTM A574-08.

.6 Hex socket flat countersunk head cap screws: ASTM F835-04el.

.7 Stainless steel hex cap screws ASTM F593-02 (2008)

.8 Hex cap screws ASTM A449-07b

.9 Lock Washers: ASME B18.21.1-2009

.10 Brass hex socket flat countersunk head cap screws: ASTM F468-06el

.11 Furnish positive type lock nuts and hardened washers for all bolts and for all flat countersunk head cap screws used as bolts. Double heavy hex nuts conforming to ASTM A563-07a are required unless indicated otherwise on the Contract Drawings. Submit alternate locking methods to the Departmental Representative for approval. All hardened steel washers: in accordance with ASTM F436-09.

.12 Tighten fasteners to provide a tension of 70% of the bolt's ultimate tensile strength unless otherwise specified on the drawings. Provide the method of tightening and of verifying the tension in all bolts on the shop Drawings for approval by the Departmental Representative.

2.3 FORGINGS

.1 Forgings: reduced to size from a single bloom or ingot until perfect homogeneity is obtained. Blooms and ingots: have a cross sectional area equal to at least three times the

required size. Forging: done at no less than red heat. Rounds for shafts and bars: true, straight and free from all injurious flaws such as piping, laps, seams or cracks. Perform ultrasonic examination of forgings in accordance with ASTM A388. Any indications using the straight beam method that cannot be readily explained by the geometry of the piece shall be cause for rejection. Any forgings that are rejected shall be replaced at no cost to the Department.

2.4 LUBRICATION

.1 Furnish the Departmental Representative with a copy of a letter from the bearing manufacturer endorsing the lubricant that has been selected. Select the center bearing lubricant for year round exposure at the bridge.

.2 Replace the lubrication piping for the balance wheels as necessary for the final balance wheel elevations. Connect the fittings to the points requiring lubrication by pipe extensions where necessary. All fittings and pipe material: stainless steel meeting ASTM A312/A312M-09 Type 316.

.3 Furnish grease for operation and testing of the machinery during construction (balance wheel bearings, rack and pinion gears). If possible, select a lubricant that is compatible with lubricants currently in use by the Department. Contact the Department for a list of used lubricants and submit written documentation indicating compatibility for any lubricant which is not in current use by the Department.

.4 For the center bearing lubricant, provide 2 times the volume used to fill the bearing for future use by the Department. Provide the lubricant in the original manufacturer's sealed container to prevent contamination.

.5 Protect all lubricants used during construction from contamination.

2.5 PAINT

.1 Note the following paint requirements for the machinery:

.1 Fully shop paint non-faying and non-lubricated surfaces of carbon steel components included within the center bearing assembly including the outside edges of the sole plate and the bottom spacer, exposed surfaces of the pivot pin, external surfaces of the bearing housing, etc. For structural interfaces, such as the pivot pin connection to the center girder, shop prime the area and provide the final coats to exposed areas in the field after assembly.

.2 Fully shop paint non-wearing areas of all rack segments (new and re-used).

.3 Fully shop paint non-faying surfaces of carbon steel shim plate used at the balance wheel installations. Prime the faying surfaces.

.4 Paint in the field all carbon steel fasteners after final assembly. Provide protective coatings as necessary to prevent corrosion during the construction period.

.5 In the shop, as applicable, prepare the component grout interfaces in accordance with the grout manufacturer’s instructions.

.6 For the east end casters and the balance wheel rail, which are to be removed and re-set, clean the mounting surface and prepare the grout interface in accordance with the grout manufacturer’s instructions. Field clean and paint non faying surfaces.

.7 For the balance wheel assemblies, clean the mounting surfaces to remove any corrosion or debris. Touch up any damaged paint at the balance wheel assemblies after installation.

.2 Perform painting and touch-up of field damaged paint for all non-machined surfaces in accordance with the requirements for painting of structural steel.

.3 Do not blast clean machined surfaces. Use an epoxy mastic high build, aluminum filled primer for all machined surfaces that require paint but cannot be blasted cleaned. Provide surface preparation in accordance with paint manufacturer's requirements. Provide intermediate and top coat of paint in accordance with paint requirements for structural steel.

.4 Exercise caution to prevent cleaning and painting materials from entering machinery components and coming into contact with sliding surfaces which would be damaged by such intrusion. Exercise extreme care to protect all lubricated and faying surfaces. Do not paint lubricated, sliding and faying surfaces.

.5 The colour for the final coat of moving parts: safety orange. The colour for the final coat of stationary parts: safety green. Submit color samples for approval.

.6 Include all painting instructions on the Shop Drawings.

2.6 SHIMS

.1 Produce shims required for leveling and alignment of machinery and equipment from brass meeting ASTM B36M or type 304 stainless steel meeting ASTM A 240M.

.2 Neatly trim the shims to the dimensions of the assembled part base and drill for all bolts that pass through the shims.

.3 Furnish sufficient shims to provide for a total thickness of not less than two times the dimensions given as "nominal shims", with one shim equal to the nominal thickness unless noted otherwise on the Contract Plans.

.4 Provide shims to allow adjustments of 0.4 mm [0.016 inch] for machinery parts unless otherwise noted on the contract drawings.

.5 Use full-size shims and achieve full contact between the shims and mating components to achieve the specified alignment requirements. In some cases, the use of partial or custom-machined tapered shims may be required to achieve the alignment requirements. Only use partial shims when the gaps produced between mating parts by the use of partial shims is less than 1/64 inch.

.6 At least 1 bolt must pass through any partial shim that is used.

.7 In cases where partials shims would produce a gap greater than or equal to 0.4 mm [1/64 inch], use a custom-machined tapered shim. The cost of any partial or custom shims (including materials, manufacturing, engineering, shipping, field measurements, etc.) is considered incidental to the work and no additional compensation will be made for providing partial or custom shims.

.8 Assemble shims not installed after final alignment and tag with the part number from the approved shop drawings, then deliver to a location determined by the Departmental Representative for future use.

2.7 NON-SHRINK EPOXY GROUT

.1 Provide non-shrink epoxy grout for use under machinery supports.

.2 Minimum compressive strength: 103.4 MPa [15,000 psi] per ASTM C579-01(2006)

.3 Linear shrinkage: less than 0.0001 mm/mm.

.4 Store and use grout in strict accordance with the manufacturer's recommendations.

2.8 WELDING

.1 Perform welding required for the work and weld inspection in accordance with the requirements of the Structural Welding Code as stated in ANSI/AWS D1.1M/D1.1-2008.

.2 Treat all machinery and weldments that support machinery as main members, all welds as joining primary components, unless otherwise specified in the Contract Documents.

.3 Do not perform field welding on these components unless specified in the Contract Documents.

.4 Open ended welds are not acceptable under any circumstances.

.5 Stress relieve welded machinery parts or supports by heat prior to final machining.

.6 Include welding and stress relieving procedures with the shop drawings for parts that require welding.

2.9 SPHERICAL ROLLER THRUST BEARING

.1 Provide a center bearing of the spherical roller thrust type, SKF 29426E or approved equal. The center bearing must be manufactured by a company that has provided spherical roller thrust bearings to the movable bridge industry for at least ten years. To demonstrate this experience, submit a list of at least three swing bridges for which that company has supplied a spherical roller thrust bearing. Submit certified information from the bearing manufacturer regarding all required fits and finishes related to the spherical roller thrust bearing housing and pivot pin.

.2 It is the Contractor's responsibility to verify that the selected bearing dimensions and tolerances fit properly with the mating components.

2.10 SPAN DRIVE RACK SEGMENTS

.1 The existing rack segments are to be disassembled, cleaned of all corrosion, realigned, and reset on new grout.

.2 One of the existing seven rack segments is damaged and is to be replaced with a new rack segment as shown on the Contract Plans.

.3 The remaining segments are to be removed and cleaned and shop-painted before re-installation. Check these segments for damage in the shop (cracks or other defects) using magnetic particle testing. Document any defects or cracks by photograph with appropriate references to identify the size and location of all defects or cracks and submit to the Departmental Representative for direction as to any required remedial action. Any corrective action will be considered extra work.

Part 3 Execution

3.1 FIELD MEASUREMENTS & SURVEY

.1 Prior to fabricating new machinery components, field survey and measure the existing systems to ensure that the replacement components and other system modifications as designed and detailed in the drawings will fit into the existing structure as intended. Perform all such surveying and measurements before preparation of the shop drawings or working drawings and before performing work at the bridge. The Contractor is responsible to ensure the field measuring accuracy is sufficient to properly fabricate and machine the components.

.2 General Survey Details.

Use a laser tracker survey for the survey measurements described herein. Use laser tracker equipment manufactured by Faro, Leica, or approved equal.

Submit a detailed survey plan for review by the Departmental Representative prior to start of work. Take all survey data so that all points can be re-established and any point can be located relative to all other points in the survey in both plan and elevation.

.3 Initial Survey. Prior to disassembly of any of the existing components, or removing the bridge from operational service, provide an initial survey to establish the pre-construction location of critical components. Include the following in the initial survey:

.1 Location of the center of the existing center bearing as defined by the intersection of two lines separate by 90 degrees. Permanently indicate this location on the bridge and with bench marks off the bridge so that this location can be re-established for future measurements.

.2 Elevations at the top of span with the span closed. Record the elevation of the top of the swing span at a minimum of five locations including the four corners directly above the end castors and above the existing center bearing location. Permanently indicate these locations on the bridge for future measurements.

.3 Elevations at the top of span with the span nearly closed (just off of the casters). Record the elevation of the top of the swing span at the same locations as measured with the span closed.

.4 Elevation of the top of the east end castors.

.5 Elevation of the top of the west end castor strike plates.

.6 Roadway gaps. Measure and record the gaps between the span and the approach at three locations on both the east and west ends. Record the temperature at the time of the measurements.

.7 Measure the elevation of the bottom of the structure at the center girder, which includes a set of four beams to which the center bearing is mounted. With the span in the closed position, survey the elevation of the center girder beams across their length and width. Provide a minimum of four measurements for each of the four I-beams, spread across the full length of each beam. Tie plates will affect these measurements at some locations. Fully document all measurement locations and required adjustments due to tie plates or other issues.

.8 Survey to determine the existing balance wheel rail elevation. Provide a minimum of 12 measurements around the circumference of the existing rail, evenly spaced between balance wheel locations.

.9 Survey to determine the existing location of the rack segments. Provide the radial distance from the center of the rack pitch line and the elevation of the rack segments. Provide a minimum of three measurement locations evenly spaced on each rack segment.

.10 Document the existing rack and pinion alignment. Record axial misalignment, backlash, and tip clearance at the closed position (on casters), at the nearly closed position (off casters), 45° open, and 90° (full open) positions.

.11 Measure the radial location of the rack pinion from the existing center bearing. Measure the rack pinion shaft deviation from plumb with the bridge in the closed and the nearly closed positions (off the casters).

.12 Operate the bridge and record the loads at the span drive. Record strain gage recordings at the rack pinion shaft and the electrical motor operating characteristics, including power, current, and voltage recorded over the full operating cycle of the bridge.

Use the initial survey results to determine the final locations of the new center bearing, the reinstalled balance wheel rail, the shimming of the balance wheels, and the rack segment locations. Operating loads will be used for a comparison of the overall span drive characteristics at the conclusion of the project.

Incorporate the survey results into shop drawings and installation plan. Submit the survey results along with the installation plan for review and approval by the Departmental Representative prior to removing the bridge from service.

.4 Intermediate Survey. After preliminary installation and alignment of components, and with the center bearing, rail and rack temporarily supported, provide additional survey to demonstrate that the alignment of the components has been achieved. Include the following in the intermediate survey:

.1 Repeat the initial survey of the location of the center bearing.

.2 Repeat the initial survey of the elevations at the top of span, span closed using the established benchmarks.

.3 Repeat the initial survey of the elevations of the top of the span with the span nearly closed.

.4 Repeat the check of roadway gaps performed during the initial survey.

.5 Survey the elevation of the balance wheel rail. Provide a minimum of 12 measurements evenly spaced around the circumference of the existing rail. Measure the balance wheel gaps with the bridge at various opening positions.

.6 Repeat the survey of the location of the rack segments performed during the initial survey.

.7 Repeat the rack and pinion alignment check performed during the initial survey.

.8 Check the center bearing alignment by measuring gaps between the dust cover and the bearing housing.

Note that the span must be moved in a controlled manner by means other than drive until such time as the alignment is approved. Establish a method to move the span on a temporary basis to adjust machinery and take measurements as required. All movements must be performed in a safe and controlled manner. Submit the proposed method of temporary movement of the span for review and approval by the Departmental Representative.

Submit full survey results for review and approval by the Departmental Representative. Do not grout components without approval of the survey results.

.5 Final Survey. After grouting the center bearing, balance wheel rail, and rack.

.1 Repeat the initial survey of the location of the center bearing.

.2 Repeat the initial survey of the elevations at the top of span with the span closed.

.3 Repeat the initial survey of the elevations of the top of the span with the span nearly closed (on casters).

.4 Measure the roadway gaps performed during the initial survey.

.5 Survey of the elevation of the balance wheel rail. Provide a minimum of 12 measurements evenly spaced around the circumference of the existing rail. Measure the balance wheel gaps with the bridge in the closed position.

.6 Repeat the alignment check for the rack segments performed during the initial survey.

.7 Operate the bridge and record the loads at the span drive. Record strain gage recordings at the rack pinion shaft and the electrical motor operating characteristics, including power, current, and voltage recorded over the full operating cycle of the bridge.

Submit full results for review by the Departmental Representative.

3.2 CONSRUCTION DETAILS

.1 Supply all apparatus, tools, devices, materials and labour to manufacture, ship, install, erect, align, adjust, lubricate, test, and paint to complete machinery as provided in the Contract Documents. Furnish any apparatus, tools, devices, materials, and labour incidental to the work, but not specifically stated or included, at no additional cost.

3.3 QUALITY

.1 Products, materials, equipment and articles incorporated in Work shall be new (unless specified otherwise in the contract documents), 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 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.

.3 Should disputes arise as to quality or fitness of products, decision rests strictly with the Departmental Representative based upon requirements of Contract Documents.

.4 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout.

3.4 INSPECTION

.1 The Departmental Representative reserves the right to inspect all machinery at the factory prior to shipping. Provide the Department Representative with full access to the manufacturer's fabrication facility for such inspections.

.2 Inspections are based on the requirements of the Specifications and Contract Drawings, referenced codes or standards, and the Contractor's approved submittal documents. The Departmental Representative has the authority to stop fabrication or shipment of any material, component, or assembly that does not comply with specified requirements. Replace or repair to the satisfaction of the Departmental Representative any such rejected item. All such replacements or repairs are made at the Contractor's expense.

.3 The Department Representative will make inspections of equipment and machinery throughout the construction period. Correct defects, deficiencies, or deviations from the Contract Drawings or Specifications discovered during such inspections at no additional cost. Shop approval of machinery does not relieve the Contractor from making such repairs as directed by the Departmental Representative.

3.5 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 Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

3.6 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 Coat finished metal surfaces and unpainted metal surfaces that would be damaged by corrosion, as soon as practical after finishing with a corrosion inhibitor. Remove this coating from all surfaces prior to lubrication for operation and from all surfaces prior to painting after erection.

.3 Mount assembled units on skids or otherwise crate for protection from weather, dirt and all other injurious conditions during shipment and storage as approved by the machinery manufacturer. Submit in advance information as to methods and materials which will be used for protection for approval by the Departmental Representative.

.4 Store machinery items as to permit easy access for inspection and identification. No outdoor storage of machinery components is permitted regardless of the methods of protection provided.

.5 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.

.6 Store products subject to damage from weather in weatherproof enclosures.

.7 Store cementitious products clear of earth or concrete floors, and away from walls.

.8 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.

.9 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.

.10 Correct damage that occurs to the machinery components as a result of improper protection during shipment or storage by the Contractor to the satisfaction of the Departmental Representative at no additional cost.

.11 Touch-up damaged factory finished surfaces to the Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

3.7 MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions.

.2 Notify the Departmental Representative in writing, of conflicts between specifications and manufacturer's instructions, so that the Departmental Representative will establish course of action.

.3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes the Departmental Representative to require removal and re-installation at no increase in Contract Price or Contract Time.

3.8 MACHINERY INSTALLATION

.1 Commence demolition of existing and installation of new components after all required components have been manufactured and approved for installation, preparations by others where required have been satisfactorily completed, initial survey is complete, and machinery installation procedure has been approved.

.2 Provide millwrights and supervising engineers with a minimum of two movable bridge jobs as previous experience in the design and installation of movable bridge machinery. The installation and adjustment of all machinery is to be led by millwrights with a minimum of ten years experience in this class of work. It is not acceptable for the installation and alignment of machinery to be led by workers of any trade other than the millwright trade.

.3 Provide oversight for the installation of center bearing by a roller bearing service engineer employed by the center bearing manufacturer. The roller bearing service engineer must have a minimum of 5 years experience in the installation and inspection of rolling element bearings for movable bridges or similar applications.

.4 The roller bearing service engineer must also review and approve the material to be included in the Operating and Maintenance Manuals regarding all necessary maintenance and inspection steps for the center bearing once in service.

3.9 SEQUENCE OF WORK

.1 As part of the installation procedure, provide a complete sequence of installation and rehabilitation for review by the Departmental Representative.

.2 All required field measurements and survey must be completed, submitted, and reviewed by the Departmental Representative prior to start of work. See Section 3.1.

.3 The sequence must protect the integrity of the existing structures and machinery systems. Note that the balance wheels must be installed for safe stable operation of the bridge.

.4 After the swing span is removed from operational service, the span must not be operated with the span drive machinery until the alignment is approved and the machinery components are fully grouted.

For interim span movements, after the span is removed from service and before the final alignment is approved the Contractor is responsible for establishing a method to move the span on a temporary basis to adjust machinery and take measurements as required. All movements must be performed in a safe and controlled manner. Provide proposed details for review and approval.

.5 For the initial operation following the rehabilitation, monitor the operation and be prepared to halt operation to ensure that no damage occurs in the event that there are issues not identified through the course of planning and performing the work.

3.10 ALIGNMENT

.1 General

Align all standard manufactured components to the tolerances specified by the manufacturer of that component unless otherwise noted on the contact plans or the specifications. Submit the manufacturers recommended alignment tolerances for a new installation as part of the installation procedure.

.2 Span Elevations

The position of the span in the seated (closed) position is to remain unchanged unless otherwise directed by the Departmental Representative based on survey results. Match the existing location of the span to within 1mm in plan and to within 1mm in elevation.

.3 Center Bearing

Set the center bearing elevation as necessary to match the span elevation within 1mm from the existing unless otherwise directed by the Departmental Representative based on survey results. Match the longitudinal and transverse location of the center bearing within 1mm total radial offset of the existing location.

.4 End Castors

The position of the span in the seated (closed) position, including the deflection at the end castors is to remain unchanged. The deflections are to be calculated based on span elevation survey measurements in the closed position minus the elevations in the nearly closed positions. Acceptable end castor alignment is based on span elevation as noted above unless otherwise directed by the Departmental Representative based on survey results.

Acceptable alignment also requires full bearing between the west casters and the re-set strike plates when the bridge is in the seated position.

.5 Balance Wheels and Balance Wheel Rail

.1 The alignment of the balance wheel rail will be considered acceptable when the top of the rail is flat and level within ± 0.5 mm over the entire rail and the rail is concentric to the center bearing within 3 mm.

.2 The alignment of the balance wheels will be considered acceptable when average gap of diametrically opposite balance wheels and the track is 1.5 mm ± 0.5 mm

during operation. Note that these gaps may be larger in the closed position when the end casters are engaged.

.6 Rack Segments

Acceptable alignment of the rack and pinion will be based on initial alignment measurements, which include backlash, tip clearance, axial alignment, and contact evaluation using layout fluid. Adjust the rack segments to provide equal or improved alignment compared to the existing alignment as evaluated by the Departmental Representative.

.7 Span Lock and Limit Switches

The span is provided with a span lock and position indicating limit switches at the southwest corner of the span. Care must be taken to maintain the pre-construction closed position so as not to affect the locks or the limit switches.

3.11 STRAIN GAGE TESTING

.1 As part of the initial and final field measurements (see Section 3.1) include recording strain gage loads at the rack pinion shaft to document the machinery loading.

.1 Methodology. Mount two strain gage rosettes on the rack pinion shaft. Mount the gages back to back (i.e. spaced 180 degrees circumferentially on the shaft) and wired in a full Wheatstone Bridge configuration so as to measure torsion only.

Connect the gages at the rack pinion shaft to a recording device capable of providing a permanent record of the strain in the shaft versus span opening angle. Record the span opening angle using an event marker mounted on the rack pinion shaft. Record the output for the span angle measurement simultaneously and on the same device with the shaft strain.

Correlate the strain from the rack pinion shaft to torque and compare the load to the capacity of the existing span drive system. Perform recordings for a minimum of three (3) complete cycles of operation.

.2 Personnel. Perform strain gage recording using personnel with experience with strain gage recording at a minimum of five movable bridges. Submit a resume to document the experience of the proposed personnel for review and approval prior to testing.

.3 Procedure. Submit a complete test procedure for approval prior to the testing. The test procedure must include the following: Test Method (including any zeroing or calibration requirements), List of Equipment, Sample Calculations, and Report Format.

.4 Reports. For each test, submit a formal report including the following: Introduction, Test Procedure and Equipment, Method of Analyzing Recorded Data, Presentation of Results (in the Form of Strip Charts Showing Strain and Torque versus Opening Angle).

.5 External Loads. Testing may only be performed when the span is fully operational and there are no external loads on the span (due to construction materials, weather, etc.).

3.12 OPERATIONAL TESTING AND CONTROLS ADJUSTMENTS

.1 As part of the initial and final field measurements include recording electrical motor characteristics at the span drive.

.1 Methodology. Record the electrical motor operating characteristics, including power, current, and voltage over the full operating cycle of the bridge for a minimum of three (3) complete cycles of operation.

.2 Reports. For each test, submit a formal report to document the results of the testing.

.2 The modifications to the systems may result in operational changes to the bridge. Coordinate with a controls systems expert for any adjustments required to the existing control system following the rehabilitation.

.1 Personnel. Controls adjustments shall be performed by the installer of the system or by personnel with substantial experience with controls adjustments for similar systems. Submit a resume to document the experience of the proposed personnel for review and approval prior to testing.

.2 Reports. Submit a formal report documenting the results of any control adjustments. The report must provide a record of all changes (if any) to the existing control scheme.

3.13 SPAN DRIVE MACHINERY REALIGNMENT

.1 With the exception of the indicated rack repairs, modifications to the span drive machinery is not anticipated. This item is provided in the event that acceptable rack and pinion contact is not achieved after replacement of the center bearing and re-installation of the rack segments.

.2 Description. The existing span drive system includes an electric gearmotor with a brake, a chain coupling, and a bearing supported rack pinion shaft.

.3 Modifications. If necessary, modifications may include small adjustments to the motor mounting position and/or shim adjustments of the rack pinion bearing(s). Movements within the existing mounting bolt holes may be possible for some slotted holes.

Modifications to the existing system may only be pursued at the recommendation of the Departmental Representative following the review of the final survey data.

.4 Alignment. Any movements must be made within the installation alignment criteria provided by the manufacturer of the installed components and within the final rack and pinion alignment criteria detailed in this specification.

3.14 SPAN BALANCE

.1 Test the balance the swing span longitudinally and transversely about the center bearing at least two (2) times. Perform the initial span balance measurement after the span is set on the new center bearing. Perform the final span balance work at the completion of the Contract Work including installation of permanent balance material. Submit a detailed balance procedure sealed by a Professional Engineer licensed in Quebec, Canada, to the Departmental Representative for review at least 6 weeks prior to balancing the swing span.

The following procedure is offered for the Contractor's consideration. The Contractor is advised that the procedure offered below demonstrates a method of balancing the bridge but is not complete in all respects. Submit a procedure that includes a complete description of all equipment and methods to be employed. The Contractor may submit an alternate procedure for review. Alternate procedures will be reviewed and accepted or rejected at the sole discretion of the Departmental Representative.

.2 Longitudinal Balance

.1 Allow the center bearing to be the sole supporter of the swing span. In the closed position, the end castors partially support the weight of the span. Either temporarily remove the castors or perform the test at a partially open position. (Note that balance wheels must be installed to safely support the span.)

.2 Determine the distance between the balance wheels and the balance wheel rail for the two balance wheels in line with the longitudinal centerline of the bridge.

.3 Jack the bridge using a hydraulic jack, located on the longitudinal centerline of the bridge, placed on the side of the center bearing which has the least clearance at the balance wheel. Equip the jack with a load cell indicator.

.4 Jack the bridge until the balance wheel on the opposite side of the center bearing from the jack just contacts the balance wheel rail.

.5 Release the pressure in the jack and determine if the bridge remains in the jacked position or returns to the position prior to jacking.

.6 If the bridge returns to the position prior to jacking then the span is out of balance in the longitudinal direction. If the span does not return to its original position proceed to step 10.

.7 Install blocking to secure bridge for the purpose of adding weight to the bridge.

.8 Add temporary weight at the end of the bridge opposite from the jack. Weights may be placed on deck along the end floor beam.

.9 Repeat steps 1 through 8 until the span does not return to its original position after jacking. For every successive cycle, increase the weight versus the weight used in previous cycle.

.10 Jack the bridge from the low side (side with balance wheel in contact) with a dial indicator positioned to indicate movement of the pivot assembly on the opposite side of the center bearing from the jack. Dial indicator to be on longitudinal centerline of the bridge. Determine the force required to initiate movement. Record this value as Feast or Fwest accordingly.

.11 Jack the bridge until the balance wheel opposite the jack just contacts the balance wheel rail.

.12 Jack the bridge from the opposite side with a dial indicator positioned to indicate movement of the pivot assembly of the opposite side of the center bearing from the jack. Dial indicator to be on longitudinal centerline of the bridge. Determine the force required to initiate movement of the pivot assembly. Record this value as Feast or Fwest accordingly.

.13 Determine the imbalance force at the east side using the following equation:

$$F_{ie} = F_{west} - (F_{east} + F_{west})/2$$

.14 Determine the required weight change at the east side of the bridge using the following equation:

W east = (F ie * d)/D

Where,

F ie = Imbalance force east (from step 13)

d = Distance to jack along longitudinal axis of bridge

D = Distance to added weight along longitudinal axis of bridge

W east = Weight change at east side of bridge.

If W east is negative, remove weight from east end of bridge or add weight to west end of bridge. If W east is positive, add weight to east side of bridge or remove weight from west end of bridge.

Note: Perform weight changes so as to keep the total weight used to a minimum.

.3 Transverse Balance

.1 Allow the center bearing to be the sole supporter of the swing span.

.2 Determine the distance between the balance wheels and the balance wheel rail for each of the two balance wheels at the transverse centerline of the bridge.

.3 Jack the bridge using a hydraulic jack placed on the side of the center bearing which has the least clearance at the balance wheel. Equip the jack with a load cell indicator.

.4 Jack the bridge until the balance wheel on the opposite side of the center bearing from the jack just contacts the balance wheel rail.

.5 Release the pressure in the jack and determine if the bridge remains in the jacked position or returns to the position prior to jacking.

.6 If the bridge returns to the position prior to jacking then the span is out of balance in the transverse direction. If the span does not return to its original position proceed to step 10.

.7 Install blocking to secure bridge for the purpose of adding weight to the bridge.

.8 Add temporary weight at the side of the bridge opposite from the jack. Weights may be placed on the deck-in-line with the center girder.

.9 Repeat steps through 8 until the span does not return to its original position after jacking. For every successive cycle, additional weight versus the weight used in previous cycle. Add necessary weights in accordance with the Structural Drawings.

.10 Jack the bridge from the low side (side with balance wheel in contact) with a dial indicator positioned to indicate movement of the pivot assembly on the opposite side of the center bearing from the jack. Dial indicator to be on transverse centerline of the bridge. Determine the force required to initiate movement. Record this value as Fnorth or Fsouth accordingly.

.11 Jack the bridge until the balance wheel opposite the jack just contacts the balance wheel rail.

.12 Jack the bridge from the opposite side with a dial indicator positioned to indicate movement of the pivot assembly of the opposite side of the center bearing from the jack. Dial indicator to be on transverse centerline of the bridge. Determine the force required to initiate movement of the pivot assembly. Record this value as Fnorth or Fsouth accordingly.

.13 Determine the imbalance force at the south side using the following equation:

F is = F north - (F south + F north)/2

.14 Determine the required weight change at the south side of bridge using the following equation:

W south = (F is * d)/D

Where,

F is = Imbalance force south (from step 13).

d = Distance to jack along transverse axis of bridge.

D = Distance to added weight along transverse axis of bridge.

W south = Weight change at south side of bridge.

If W south is negative, remove weight from south side of bridge or add weight to north side of bridge. If W south is positive, add weight to south side of bridge or remove weight from north side of bridge.

The balance shall be considered acceptable when the span is balanced longitudinally and transversely within 5000 Nm in each direction.

Note: Make all weight changes so as to keep the total weight used to a minimum.

.4 Report the required weight of balance material to the departmental representative for review. Furnish and install permanent weights in locations as described in the structural drawings.

END OF SECTION