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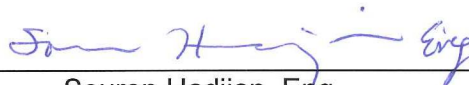
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Parks
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Design of Expansion Joints of L.H.N.C. Dam of Saint-Ours island, Quebec

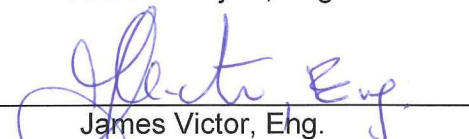
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SECTION 011100 – SUMMARY OF WORKS

011100 – SUMMARY OF WORKS

1. GENERAL

1.1 Related Sections

1. Section 017411 – Cleaning
2. Section 031000 – Concrete Forming and Accessories
3. Section 032000 – Concrete Reinforcing
4. Section 033000 – Cast-in-place Concrete
5. Section 055000 – Miscellaneous Metal Sections

1.2 Work Covered by Contract Documents


1. The work covered by this contract includes the repair of expansion joints in the St-Ours dam on the Richelieu River and related civil works

1.3 Contract Method

1. The work shall be performed on a lump sum basis.


1.4 Scope of Work

1. Include but not limited to:
 1. The supply delivery and replacement of the first existing expansion joint (including the dismantling of the existing joint), counting from the Ville de Saint-Roch de Richelieu side, with a new mechanical expansion joint fitted with a premoulded extrusion seal and all related installation works.
 2. The repair of the concrete deck where required.
 3. The unloading off section that will be preserved by Parks Canada to a place designated by Parks Canada. All labor, materials and equipment required to complete the work and all the accessories or equipment not specifically mentioned in the technical specifications, but necessary to complete the work.

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SECTION 011100 – SUMMARY OF WORKS

4. The supply of fifteen (15) additional expansion joints and their carting and off-loading at the following address: Ateliers de Agence Parc Canada, 1840 Avenue de Bourgogne, Chambly (Québec) J3L 1Z3. The expansion joints shall be numbered 2 to 16 counting from the second joint from the side of Ville de Saint-Roch de Richelieu. Then, the new joints, clearly identified by their number, shall be dimensioned individually according to the present condition of their installation site on the concrete deck.
5. The supply of one (1) spare premoulded extrusion seal.
2. The work shall include :
 1. A joint visit (Contractor/Departmental Representative) in order for the Contractor to appreciate the nature of the works and to evaluate the available space near the lock to complete the works.
 2. The supply, fabrication, and transport of the expansion joints and related parts as indicated on the drawings.
 3. The removal and reinstallation of the guard rails. Parks Canada will be responsible for any modification that might be required on the guard rails and on the fence. The Contractor shall inform Parks Canada if the said modifications are required and shall coordinate with the latter work involved.
 4. The saw-cutting, the demolition and the grinding of the concrete deck.
 5. Installation of the expansion joints.
 6. The cleaning and rearranging the work sites as well as getting rid of unwanted materials outside of Canada Parks.
3. The works shall include the supply of the following documentation for review by the Departmental Representative :
 1. Drawings showing the location, construction, equipment necessary for the performance of work (construction trailer, crane, catwalks, temporary access, fencing, etc.)


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SECTION 011100 – SUMMARY OF WORKS

2. The method to replace expansion joints and the rearranging railings. Moreover, the method must clearly describe the Contractor's method of demolition and installation of expansion joints and other related work.
3. Shop drawings sealed and signed by an Engineer, member of the "Ordre des Ingénieurs du Québec" (OIQ).
4. Technical data sheets of the products used for the fabrication and the installation of the equipments (grout, anchors, hardware, etc.)
5. Health and Safety Plan.
6. Environmental Protection Plan.
7. Work Schedule.
8. As-built drawings.

1.5 Contractor's Use of Premises

1. Availability of job site to be determined.
2. Work areas of the site will be available without restriction as per Departmental Representative's approval and coordination, until substantial completion of the project.
3. Obtain and pay for the use of additional storage or work areas needed for operations under the present Contract.
4. Do not pile materials that will obstruct the site access.
5. During the works, the site shall not be used as a temporary residence by the Contractor.
6. At completion of operations condition of existing work: equal to or better than that which existed before new work started.
7. Parks Canada retains the right to have access to the work areas at all times.
8. Parks Canada shall not supply services to the Contractor, such as electricity, water, etc.

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SECTION 011100 – SUMMARY OF WORKS

1.6 Required Documents


1. Maintain at job site, one copy of each document as follows:
 1. Contract Drawings;
 2. Specifications;
 3. Addenda;
 4. Reviewed Shop Drawings;
 5. Non-reviewed Shop Drawings list;
 6. Change Orders;
 7. Other Modifications to Contract;
 8. Copy of Approved Work Schedule;
 9. Health and Safety Plan and Other Safety Related Documents;
 10. Environmental Protection Plan.

2. WORK REQUIRED FOR CONCRETE DECK PREPARATION

1. The following method defines the preparation of the concrete deck before installing the expansion joint. The Contractor may offer an alternative for the production of concrete. The method of the Contractor shall be subject to approval by Departmental Representative.


2.1 Concrete Deck Preparation Method

1. The Contractor shall follow the ensuing construction method:
 1. Prior to starting work, existing guardrails that hinder installation of the expansion joints should be dismantled and stored in a designated area until their resettlement;
 2. All the materials shall be temporarily dismantled and shall be adequately and securely supported;

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SECTION 011100 – SUMMARY OF WORKS

3. Where the existing posts of the security guardrails be installed directly on the elements of expansion joints, they must be dismantled and relocated adjacent to the expansion joint;
4. The Contractor shall notify the representative from the start of work if changes are required to the rails, fences, railings or other article temporarily dismantled before reinstallation. The Contractor shall provide the effect on the schedule as appropriate;
5. The Contractor shall maintain the continuity of the guardrails;
6. Prior to saw cutting of concrete, a non-stick polyethylene dowel shall be inserted in the joint to avoid the accumulation of debris in the joint;
7. Saw cut the reinforced concrete to the thickness shown on the drawing immediately collecting the water used in the sawing process;
8. In order to avoid the use of a pneumatic hammer, it is suggested to carry out a series of parallel saw-cut lines on the full length of the concrete before removing the latter with light tools;
9. Break the concrete corner in a straight edge without damaging the adjacent concrete;
10. Saw cut a 16 mm deep on each side of the expansion joint to clearly mark the demolition zone before the removal of the concrete.
11. Grind the demolished area to a depth as shown on the drawing;
12. Grind the concrete corners in order to fit the steel angle against concrete;
13. The earthing wire shall not be damaged during construction;
14. The galvanized steel pipe embedded in the concrete parapet shall not be touched or damaged;
15. The existing water-stop shall not be damaged;
16. The Contractor shall use the steel expansion joint as template to the drill the holes of the installation anchor bolts;


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SECTION 011100 – SUMMARY OF WORKS

17. Vacuum clean all the dust and debris accumulated during construction in the joint;
 18. Remove the non-stick polyethylene dowel from the joint;
 19. Re-vacuum the joint to remove the debris left behind;
 20. Clean all concrete surfaces that were involved in the saw cutting and demolition with a damp cloth;
 21. Apply a coat of Sikaflex 2C-NS on all surfaces, even vertical ones, that will support the steel expansion joint to assure that the joints are watertight;
2. Work on Expansion Joint
1. Build the expansion joint in accordance to the details shown on the drawings;
 2. The expansion joint shall be built as one piece in the shop. No assembling will be allowed on the job site.
 3. The watertight rubber extrusion shall be installed on the jobsite.

3. CONCRETE REPAIR WORK

1. The Contractor, accompanied with the Departmental Representative, shall clearly identify the location where concrete deck requires repair;
2. The concrete repair method shall be submitted to the Departmental Representative before the work begins;
3. Before concreting, the Contractor shall insert steel dowels in the existing concrete that shall also be embedded in the new concrete to create a bond between them;
4. The concrete work shall be performed in accordance to the sections 031000, 032000, and 033000 of the present technical specifications

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SECTION 013300 – SUBMITTAL PROCEDURES

013300 – SUBMITTAL PROCEDURES

1. GENERAL

1.1 Administrative


1. Submit to Departmental Representative the required submittals listed for review. Submit promptly and in orderly sequence as to not cause delay in Work. Failure to submit in time is not considered sufficient reason for extension of the 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 if field measurements and affected adjacent Work are co-ordinated.
8. Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
9. Keep one reviewed copy of each submission on site.

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SECTION 013300 – SUBMITTAL PROCEDURES


1.2 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 Province of Quebec.
3. Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work.
4. Allow ten work 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; and
 5. Other pertinent data.

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SECTION 013300 – SUBMITTAL PROCEDURES

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. Materials and fabrication details;
 2. Layout, showing dimensions, including identified field dimensions, and clearances;
 3. Setting or erection details;
 4. Standards;
 5. Relationship to adjacent work.
 6. After Departmental Representative's review, distribute copies of the shop drawings and the technical data sheets.
 7. Submit an electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
 8. Submit an 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.

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SECTION 013300 – SUBMITTAL PROCEDURES

9. Submit an 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.
10. Submit documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
11. Supplement standard information to provide details applicable to project.
12. 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.

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SECTION 013529.06 – HEALTH AND SAFETY REQUIREMENTS

013529.06 – HEALTH AND SAFETY REQUIREMENTS

1. GENERAL

1.1 References

1. Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
2. Health Canada/Workplace Hazardous Materials Information System (WHMIS) :
 1. Material Safety Data Sheets (MSDS).
3. Province of Quebec :
 1. Act Respecting Occupational Health and Safety, R.S.Q.

1.2 Action and Informational Submittals


1. Submit site-specific Health and Safety Plan 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.

1.3 Safety Assessment

1. Perform site specific safety hazard assessment related to project.
2. Contractor must pay particular attention to surrounding power lines and take necessary precautions to ensure work is safe. Contractor shall take measures in accordance with the R.S.Q.

1.4 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.


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SECTION 013529.06 – HEALTH AND SAFETY REQUIREMENTS

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

1.5 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. 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.

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SECTION 013543 – ENVIRONMENTAL PROCEDURES

013543 – ENVIRONMENTAL PROCEDURES

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; unfavorably 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. Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
2. Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
3. Address topics at level of detail commensurate with environmental issue and required construction tasks.
4. Include in Environmental Protection Plan :
 1. Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 2. Names and qualifications of persons responsible for training site personnel.
 3. Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 4. Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

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SECTION 013543 – ENVIRONMENTAL PROCEDURES

5. 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.
6. Waste Water Management Plan identifying methods and procedures for management or 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.

1.3 Fires

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

1.4 Drainage


1. Provide temporary drainage and pumping required to keep excavations and site free from water.
2. Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
3. Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.5 Work Adjacent to Waterways

1. Construction equipment should be used only from the shore.
2. Waterways to be kept free of excavated fill, waste material and debris.


1.6 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.

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SECTION 013543 – ENVIRONMENTAL PROCEDURES

4. Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- 2. EXECUTION**
- 2.1 Cleaning**
- 2.1.1 Progress Cleaning**
1. Clean in accordance with Section 017411 - Cleaning.
 1. Leave Work area clean at the end of each workday.
- 2.1.2 Final Cleaning**
1. Upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 017411 – Cleaning.

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SECTION 014500 – QUALITY CONTROL

014500 – QUALITY CONTROL

1. GENERAL


1.1 Related Requirements

1.2 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. 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.

1.3 Independent Inspection Agencies

1. Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by Departmental Representative.
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 inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

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SECTION 014500 – QUALITY CONTROL

1.4 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.

1.5 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 cause no 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.

1.6 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 Contractor's work damaged by such removals or replacements promptly.
3. If in the 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 Departmental Representative.

1.7 Site Testing

1. Provide site test reports stated in the herein technical specifications.

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SECTION 015200 – CONSTRUCTION FACILITIES

015200 – CONSTRUCTION FACILITIES

1. GENERAL

1.1 Installation and Removal


1. Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
2. Identify areas which have to be graveled to prevent tracking of mud.
3. Indicate use of supplemental or other staging area.
4. Provide construction facilities in order to execute work expeditiously.
5. Remove from site all such work after use.

1.2 Scaffolding

1. Scaffolding in accordance with CAN/CSA-S269.2.
2. Provide and maintain scaffolding, ramps, and ladders.

1.3 Hoisting

1. Provide, operate and maintain hoists and cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for their use of hoists.
2. Hoists and cranes to be operated by qualified operator.
3. Contractor shall take necessary precautions in order to respect minimum approach distances from powerlines in accordance with the “Loi sur la santé et la sécurité du travail” (L.R.Q.). In the case where the minimum approach distances can't be respected, Contractor shall take necessary arrangement with the electricity provider in accordance with the (L.R.Q.).
4. Before using lifting equipments, the position of the lifting equipments in regards to the adjacent works shall be accepted by the Departmental Representative.

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SECTION 015200 – CONSTRUCTION FACILITIES

1.4 Site Storage/Loading

1. Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
2. Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.5 Construction Parking

1. Provide and maintain adequate access to project site.
2. Clean runways and taxi areas where used by Contractor's equipment.

1.6 Equipment, Tool and Material Storage

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

1.7 Sanitary Facilities


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

1.8 Construction Signage

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


1.9 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.

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SECTION 015200 – CONSTRUCTION FACILITIES

4. Stack stored new or salvaged material not in construction facilities.

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SECTION 016100 – COMMON PRODUCT REQUIREMENTS

016100 – COMMON PRODUCT REQUIREMENTS

1. GENERAL

1.1 Quality


1. Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
2. Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item.

1.2 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 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.
2. In event of failure to notify Departmental Representative at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Departmental Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.3 Storage, Handling and Protection

1. Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
2. Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
3. Store products subject to damage from weather in weatherproof enclosures.
4. Replace all damaged materials without additional cost to the Departmental Representative's satisfaction.

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SECTION 016100 – COMMON PRODUCT REQUIREMENTS

5. Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use touch-up materials to match original. Do not paint over name plates.
6. Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.4 Transportation

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

1.5 Manufacturer's instruction


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

1.6 Quality of Work

1. Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Departmental Representative if required Work is such as to make it impractical to produce required results.

1.7 Co-ordination

1. Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.

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SECTION 017200 – PROJECT DOCUMENTS


017200 – PROJECT DOCUMENTS

1. DRAWINGS

1. The Engineer will provide two sets of drawings to include in the project file.
2. Keep drawings and note all differences with contractual documents, changes due to site constraints and changes stated by the Engineer.
3. Changes must be noted (in red).
4. Record following information:
 1. Modifications to dimensions and executions details done in the field.
 2. Modifications done from orders given in the field.
5. After Works are finished and before the final inspection, transcribe carefully all modifications on the second set of drawings and give the two sets to the Engineer.

2. DOCUMENTATION TO DEPOSIT AT THE END OF THE PROJECT

1. At the end of the project, Contractor shall deposit an end project manual. This manual shall contain all documents submitted during the project as stated in Section 011100, Paragraph 1.4.3.

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SECTION 017411 – CLEANING

017411 – CLEANING


1. GENERAL

1.1 Project Cleanliness

1. Maintain Work in tidy condition, free from accumulation of waste products and debris.
2. Store volatile waste in covered metal containers, and remove from premises at end of each working day.
3. Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
4. Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces.

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 and leave Work clean and suitable for occupancy.
3. Clean lighting reflectors, lenses, and other lighting surfaces.
4. Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
5. Recondition grass or install new sod at damaged areas during construction.

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SECTION 031000 – FORMWORK FOR CONCRETE

031000 – FORMWORK FOR CONCRETE

1. GENERAL

1.1 Related Requirements

1. Section 032000 – Reinforcing Bars for Concrete
2. Section 033000 – Cast in Place Concrete

2. CONCRETE FORMWORK

2.1 General


1. The contractor is responsible for the design , supply, construction, maintenance , dismantling and after completion of the work, carting outside of the jobsite, all temporary supports and the required formwork for concreting as shown on the drawings and as described in the technical specifications.

2.1.1 Norms

1. The materials and the methods used, for performing the work, shall be according to the latest editions of the following norms:
 1. CAN/CSA-A23.1 Concrete Materials & Methods of Concrete Construction
 2. CAN/CSA-S269.3-M Concrete Formwork
 3. ACI 347 Guide to Formwork for Concrete

2.1.2 Formwork Classification

1. Formwork is classified in accordance with the quality of the concrete surface required. The various formwork classes shall conform to the drawings, specifications and stipulations set forth below:
 1. Class F1: Used to create surfaces that will be backfilled or will never be exposed. Formwork may be built with minimal roughness treatment.


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SECTION 031000 – FORMWORK FOR CONCRETE

2. Class F2: Used to create exposed surfaces other than those described in other classes. Formwork shall be made in a way that will result in a concrete surface with uniform texture and appearance. The same material for all form walls of this class shall be used. Patching of formwork surface openings is prohibited.
2. The formwork anchor shall be placed in orderly patterns and well aligned. Plastic plugs shall be used which shall be removed after the curing of concrete and the holes shall be filled with non-shrink grout.
3. All moldings, chamfers and indentation timbers etc. required to obtain surfaces, profiles and recesses shown on the drawings shall be of good quality pines, with planed and precise surfaces, especially those that are in contact with the concrete that shall be solidly fixed inside the formwork to assure perfect alignment during the placing of concrete and during the time required for the curing of concrete.

2.1.3 Shop Drawings

1. The contractor shall prepare formwork and temporary drawings. These drawings shall be transmitted to the Departmental Representative for review.
2. The transmitted drawings shall be signed and sealed by an engineer in good standing of l'Ordre des Ingénieurs du Québec.
3. The drawings shall clearly indicate the method and sequence of construction, the materials, the spacing, the location of joints, ties, the supports, the claddings, placing of temporary embedded supports, the rate of placing concrete, construction loads and temperature of concrete at the time of placing.
4. Apart from the mentioned details, the drawings shall indicate, at all areas where the temporary supports are fixed to or supported on existing structures or a new structure that has been freshly built, the maximum exerted forces and their direction on these structures that support these efforts, having in mind the over exertion of structures in on jobsites.
5. The Contractor shall write on the drawings the sequence and the method of using the formwork and the reuse of temporary works and formwork methods.
6. Temporary works shall be designed so that, during construction, no forces are exerted by them on structures that are higher than the structure designed forces.

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SECTION 031000 – FORMWORK FOR CONCRETE

7. The design of temporary works shall take into account the sequence of their use during construction.
8. The contractor shall be the only responsible party for the temporary works and the formworks.
9. The Contractor shall be familiar with all the laws and regulations applicable to the design and construction of temporary works and formwork and shall respect them.

2.2 Materials

2.2.1 Formwork Wood

1. Formwork wood shall be solid free of loose knots, warping, etc. Unless noted on the drawings, all formwork for all exposed concrete faces shall be made of plywood panels having at least 16 mm thickness (5/8 inches). The panels' dimensions shall be 2400 mm by at least 600 mm where the dimensions are appropriate. The wood shall be new. All the corners and edges shall be intact and the surfaces shall be smooth without delaminating. Tongue and grooves board shall not be accepted.

2.2.2 Prefabricated Formwork


1. The steel prefabricated formwork or formwork made of reinforced wood shall comply with the requirements of rigidity, water-tightness and general quality described in the present technical specifications.

2.2.3 Fasteners

1. The vertical walls of the formwork must be connected to each other or to a solid mass of concrete by metal fasteners. The use of stranded steel wires as anchors is not allowed.

2.2.4 Spreaders

1. Wooden spreaders shall be removed as concrete pouring progresses to the intended levels. Concrete spreaders, as well as the ones that are part of fasteners, can be left in the concrete pour. Fasteners must be arranged so as not to interfere with the concreting. They should be placed in vertical planes at a reasonable horizontal distance between them. The ends of the ties must be cut at 40 mm from the surface within the concrete, even for the non-exposed concrete surfaces. The concrete spreaders must have a minimum

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SECTION 031000 – FORMWORK FOR CONCRETE

28 day compressive strength of 30 MPa and shall be air-entrained according to the mix aggregates.

2.3 Execution

1. In order to avoid the adhesion of concrete to the formwork, the surfaces thereof should be treated with a specific product or brushed with fresh mineral oil, colorless, free of detergent and kerosene. The data sheet must be submitted to the Departmental Representative for review. The formwork surfaces must be stained prior to their installation. The Contractor shall take all necessary precautions to ensure that the oil does not come into contact with the reinforcing bars.
2. Formwork shall be securely fastened in place, braced and supported to support the loads to which they are exposed while maintaining their alignment until the concrete sets. All formwork shall be watertight and no grout shall be allowed to ooze out of the formwork.
3. The lift levels must be referenced by installed moldings. Unless otherwise indicated, all the sharp edges must be chamfered to 20 mm, no matter if the surfaces are exposed or not. Tolerances shall respect the criteria mentioned in the Cast in Place Concrete Section.


2.4 Inspection and Quality Control

2.4.1 Formwork Inspection

1. Prior to concrete pouring, the Contractor shall ensure that the formwork complies with the requirements of the present technical specifications and formwork drawings.
2. During concreting, the Contractor shall also ensure continuously that the formwork remains aligned and elevations respect the tolerances.

2.4.2 Inspection of Construction Tolerances

1. The Contractor shall perform all the necessary inspections and verifications to demonstrate that the tolerances are respected, all in accordance with the criteria stipulated in the technical specifications.

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SECTION 032000 – REINFORCING BARS FOR CONCRETE

032000 – REINFORCING BARS FOR CONCRETE

1. GENERAL

1.1 Related Requirements

1. Section 031000 – Formwork for Concrete
2. Section 033000 – Cast in place Concrete

1.2 Description


1. The work described in this chapter includes the preparation of the placing drawings and reinforcing steel bar list, the supply, fabrication, delivery to the work site, the storage and installation of the bars, including all tie wires, spacers and supports in the cast-in place concrete as shown on the drawings and as described by the specification.

1.2.1 Norms

1. The supply, the preparation and installation of reinforcing bars shall comply with the criteria of this section and the latest edition of the following norms:
 1. Reinforcing steel: CAN/CSA-G30.18-M
 2. Standard Specification for Steel Welded Wire: CAN/CSA-G30.5-M
 3. Bending Guide: CAN/CSA-A23.1, A23.2 and A23.3
 4. Placing of reinforcing bars: CAN/CSA-A23.1
 5. Recommended Norms Manual: Reinforcing Steel Institute of Canada

1.2.2 Shop Drawings and Bar Lists

1. Bar lists and placing drawings shall be prepared by the Contractor and issued to the Departmental Representative for review before starting the shop work.

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SECTION 032000 – REINFORCING BARS FOR CONCRETE

2. Placing drawings shall indicate the quantities, size, length, weight, layout, spacing and designation of reinforcing steel, as well as the splices position and length for any part of the structure. Reinforcing steel bars as well as bar lists shall be described in accordance with the “Reinforcing Steel Manual of Standard Practice” from the Reinforcing Steel Institute of Canada (RSIC).


1.3 Materials

1.3.1 Reinforcing Bar

1. Reinforcing steel bars shall be of grade 400W ($f_y = 400$ MPa), and shall comply with the latest edition of CAN/CSA-G30.18-M.
2. All bars shall be of new unused steel, exempt of rust, scales of lamination or other matters that will prevent or diminish their bond to the concrete and shall comply with the test of conformity to the mentioned norms and the present technical specifications.
3. Compliance certificates of elements used in the steel fabrication shall be submitted to the representative of the Ministry before the delivery of all the reinforcing steel, indicating the chemical composition as well as the mechanical test results that comply with CAN/CSA G30.18-M and CAN/CSA G30.5-M, without additional cost. The frequency of the tests shall be in accordance with the norms mentioned above.
4. The materials and the fabrication methods shall be subject to inspection by the Departmental Representative, who shall be allowed to visit, at all times, the areas where the reinforcing steel is being fabricated in accordance with the present technical specifications.

1.3.2 Supports

1. The supports supplied by the contractor shall be of steel or concrete that shall have a minimum compressive strength of 30 MPa at 28 days. Exposed steel shims shall not be accepted.

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SECTION 032000 – REINFORCING BARS FOR CONCRETE

1.4 Execution

1.4.1 Placing Reinforcing Bars

1. The spacers and supporting shims shall be used only where necessary.
2. Splices shall be located only where called for on the engineering drawings. They shall always be made by overlapping, unless otherwise indicated on drawings.
3. Spliced bars shall be placed at the same depth in the concrete or at the same radial distance in a circle or as shown on the drawing.
4. The reinforcing bars shall be placed in accordance to the engineering drawings. They shall be firmly fixed inside the formwork before pouring the concrete and shall be attached to each other with wires having at least 1.6 mm diameter so that there will not move during the placing of concrete.
5. The bars shall be attached to each other to form a solid mesh supported by steel or concrete supports. The supports shall have structural strength to withstand the weight of the reinforcing bars. Loose non-attached bars shall not be accepted. Vertical bars shall be plumb and shall have their tops fixed against movement during concrete placing.
6. Spacing between the bars and the formwork shall be maintained by proper spacers. The concrete cover shall be according to CAN/CSA-A23.1 or as shown on drawings.


1.5 Inspection and Quality Control

1.5.1 Dimensional Verification

1. The Contractor shall verify the dimensions of the reinforcing bars in order to show the exactness of their supply all in compliance with the bar schedule for bending and respecting the tolerances.


1.5.2 Placing Inspection

1. The Contractor shall perform thorough verification to assure that the placing of the reinforcing bars is according to the drawings and the tolerances and applicable norms are respected.

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SECTION 032000 – REINFORCING BARS FOR CONCRETE

2. The Contractor shall secure the reinforcing bars and their supports such that they will not move during the placing and vibrating of concrete.

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SECTION 033000 – CAST IN PLACE CONCRETE

033000 – CAST IN PLACE CONCRETE

1. GENERAL

1.1 Related Requirements

1. Section 031000 – Formwork for Concrete
2. Section 032000 – Reinforcing Bars for Concrete

1.2 Description

1. This section covers the repair works to be carried out to the bridge deck and the parapets.


1.3 References

1. Canadian Standards Association (CSA)/CSA.
2. CSA A23.1/A23.2, Concrete Materials & Methods of Concrete Construction / Test Methods & Standard Practices for Concrete materials.

2. PRODUCTS

2.1 Materials

1. Materials Portland cement: for general use, complying with CSA A3001, of type GU.
2. Mixing water: CSA A23.1.
3. Aggregates (fine and coarse): CSA A23.1/A23.2.
4. Admixtures
 1. Specifications for Air-Entraining Admixtures for Concrete: ASTM C260.
 2. Standards Specification for Chemical Admixtures for Concrete: ASTM C494. The use of accelerator or retardants during concreting in hot or cold weather and the use of all other admixtures shall be subject to the prior approval by the representative of the Ministry.


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SECTION 033000 – CAST IN PLACE CONCRETE

5. Non-shrink grout: premix product containing non-metallic aggregates, Portland cement (GU), super-plasticizer and water reducer according to CSA A23.1/A23.2.
 1. 28 Day compressive strength: 30 MPa.
 2. Mixing the super-plasticizer shall be done at the point of discharging of the concrete after testing the slump. The slump after the addition of super-plasticizer shall be 130 ± 30 mm.
6. Curing compounds: according to CSA A23.1/A23.2 containing coloring agent.
7. Bonding adhesive: Sika Later R or approved equivalent.

2.2 Mixing Formulas

1. Method of preparing concrete: Concrete shall be prepared to according the criteria established in CAN/CSA A23.1/A23.2 supervised by the Departmental Representative.
 1. The concrete suppliers shall assure that the ensuing criteria are met and perform quality control as described in the quality control requirements.
 2. Liquid concrete mix shall have the following characteristics:
 1. Slump: 75 mm.
 2. Air entrainment: 6 to 8%.
 3. Once set, the concrete mix shall respect the following criteria:
 1. 28 Day compressive strength: At least 30 MPa.
 2. Aggregate diameter: 20 mm maximum.
 4. Submit quality control management plan to assure a thorough concrete quality control respecting strict the performance criteria. Certification of the concrete supplier: the batching plant and the concrete constituents shall respect the criteria given in CSA A23.1.

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SECTION 033000 – CAST IN PLACE CONCRETE


3. CONCRETE PLACEMENT

3.1 Preparation

1. The base for the concrete slab shall be prepared as shown on the drawings. Remove all loose materials. Remove the existing concrete debris preserving the existing reinforcing bars as shown on the drawings. Clean the reinforcing bars and existing surfaces.

3.2 Execution

1. Execute concrete placement according to CSA A23.1/A23.2.
 1. Cold weather concrete placing shall be according to CSA A23.1/A23.2.
2. Finish
 1. Whatever the type of pour, its surface shall be compacted and trowel finished by incorporating the aggregates in the concrete mass and removing all irregularities. After the first finishing with wood trowel, the surfaces shall not be touched until the bleeding has occurred.
 2. The vertical difference between the existing and new concrete shall not be more than 3 mm.
3. Concrete Curing
 1. Concrete curing shall be according to CAN/CSA A23.1/A23.2-M.
 2. Immediately after placing, the concrete shall be protected against rapid drying, against excessive high or low temperatures, damage and must be maintained at a relatively constant temperature with minimum moisture loss during the period necessary for the cement hydration.
 3. The basic curing method is cure by water for seven (7) consecutive days.
 4. The lining inside the formwork may be kept in place after formwork removal in order to minimize the use of burlap. In case curing by water is not possible, the contractor may suggest other methods of curing.

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SECTION 033000 – CAST IN PLACE CONCRETE


5. The curing shall continue at least seven (7) days. During this time, the surfaces shall not be allowed to dry. Special care shall be taken inside heated shelters.
4. Curing Products
 1. In case curing compounds are used, they shall be colored and shall respect the criteria stipulated in ASTM C309. The efficiency of water retention of these products shall be tested in laboratory prior to their use. The use of curing compound containing linseed oil shall be prohibited. The use of compound on surfaces where fresh concrete is to be poured in also prohibited
 2. The products shall be applied immediately after the surfaces are finished or stripped of formwork as the case may be.

3.3 Site Quality Control

1. If required, the inspection and tests of concrete will be done by a laboratory designated by the Departmental Representative, to the satisfaction of the latter and according to CSA A23.1/A23.2.
2. Replace all concrete that do not meet the criteria of the technical specifications.

3.4 Concrete Repair

1. The Contractor is responsible for repair works of the concrete that was cast in place that did not meet the criteria of the technical specification and the drawings.
2. The Contractor shall submit to the Departmental Representative the method of concrete repair and the intended repair products.


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SECTION 055000 – MISCELLANEOUS METALS AND EMBEDDED PARTS

055000 - MISCELLANEOUS METALS AND EMBEDDED PARTS

1. SCOPE OF WORK

1. The work described in this Specification includes, unless otherwise specified, the supply fabrication, transportation, handling and installation of all miscellaneous metals, embedded and non-embedded as described on the drawings and in the present technical specifications or as required by Perks Canada.
2. The miscellaneous steel supplied and installed by the Contractor shall include but not limited to:
 1. The steel sections for the expansion joints;
 2. The guard rails (if required);
 3. All other metals supplied by the Contractor indicated on the drawings.
3. The term “embedded parts” refers to all parts that are either partially or completely embedded in concrete.
4. Unless otherwise indicated, the Contractor is responsible for the preparation of the shop and fabrication drawing, the design of assembly of all parts that shall be supplied according to the drawings and the present technical specifications. The supply of metal parts shall conform to the drawings, type of material, loading cases, codes and norms specified in the technical specifications and drawings. The parts to be supplied shall not be modified without the prior approval of the Departmental Representative. The drawings shall be signed and sealed by a member in good standing of the “Ordre des ingénieurs du Québec”. The Contractor shall transmit to the Departmental Representative for review the shop drawings according to an agreed schedule.
5. The contractor is responsible for packaging, up-loading, transporting and off-loading and handling all miscellaneous metals from the point of manufacturing to the point of installation. The Contractor shall assure that no part is damaged during the handling and transportation of the miscellaneous parts.
6. The contractor is responsible for warehousing the miscellaneous parts at all times. All lost or damaged parts shall be replaced or repaired by the Contractor on Contractors expense.

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SECTION 055000 – MISCELLANEOUS METALS AND EMBEDDED PARTS

7. Unless otherwise stated, all miscellaneous parts supplied by the Contractor shall be hot dipped galvanized.
8. The results of the tests pertaining to the thickness and the quality of galvanization shall be submitted to the Departmental Representative.
9. Codes and standards

The supply, the materials, the welding, the machining and the installation of the miscellaneous steel parts shall conform to the specifications of the present chapter.

1. Codes and Standards of Steel Construction

Limit States Design of Steel Structures General Requirements for Rolled or Welded Structural Quality Steel	CAN/CSA-S16.1 CAN/CSA G40.20-04
Specifications for design of cold formed structural elements	CSA W178.2 and S136
Structural Quality Steel	CSA G40.21-M, 300W
Standard Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality	ASTM A108-99, 1020
Sleeves and Pipes	ASTM A53 A or B 108-99, type E or S
Anchor Bolts	CAN/CSA G30.18-09
Standard Specification for Structural Bolts	ASTM A325-96
Galvanizing Procedure	CAN/CSA G164-M92

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SECTION 055000 – MISCELLANEOUS METALS AND EMBEDDED PARTS

2. Welding

Welded Steel Construction (Metal Arc Welding)	CAN/CSA W59-03 (R2008)
Filler Metal and Allied Materials for Metal Arc Welding	CAN/CSA W48-06
Certification of Companies for Fusion Welding of Steel	CAN/CSA W47.1-09
Certification of Welding Inspection Organizations	CSA W178.1-08

3. Non-Destructive Tests of Welds


Standard Guide for Magnetic Particle Testing	ASTM E709-08
Standard Reference Photographs for Liquid Penetrant Inspection	ASTM E433-71(2008)
Accreditation of personnel in control of non-destructive testing	CAN/CSA W178.2

4. Standard for Surface Preparation

Surface Preparation	SSPC-SP1 and SP8
Metal Cleaning by Mechanical Tools	SSPC-SP3-82
Surface Inspection	SSPC-Vis 1-89

5. The following codes shall govern the work:

1. National Building Code of Canada NBC;
2. Standard Practice for Steel Construction CISC;
3. Construction Security Code issued by "Commission de la Santé et de la Sécurité du travail du Québec.


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6. The Contractor shall have all the norms the codes and the technical specifications at hand during the work at the shop and at the jobsite;
7. The anchored shell type expansion bolts shall be accepted by the Departmental Representative.
8. The metals used for the fabrication of the permanent element shall be new and in one piece. Prior to fabrication, the contractor shall submit to the Departmental Representative certificates of conformity of executed tests en steel and all other materials. Lack of these certificates will oblige the Contractor to conduct these tests at his own expense by laboratories accepted by the Departmental Representative.
9. The Contractor shall submit to the Departmental Representative all samples of materials used before or during fabrication.
10. Acceptance of the materials by the Departmental Representative does not relieve the Contractor from obligation to comply with the requirements of these specifications shall not prevent the Contractor from subsequent rejection of materials when found defective.
11. All replacement material must be subjected to a series of tests to prove to the Departmental Representative, that its quality is equal to or greater than the originally specified material.
12. All copies of orders for materials or work awarded to steel mills, suppliers or subcontractors must bear the inscription: "This order is subject to inspection by the Departmental Representative."

2. MATERIALS AND FABRICATION

1. Test certificates and mill analysis (Mill Test Certificates) (sheets, profiles, fasteners, etc.), see section 1.11.1 of this chapter.
2. Shear studs used for concrete repair must be accepted by Departmental Representative. They must be cold formed that meets the requirements of ASTM A108-99, standard grade 1020 steel.
3. The Contractor shall submit to the Departmental Representative all test results for review.
4. The Contractor shall prepare all shop drawings and submit them for approval by Departmental Representative prior to manufacturing.

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5. The metal parts provided by the Contractor shall be manufactured according to requirements of CSA S16.1 and S136.
6. The welds must comply with the requirements of sections "Welding and Inspection," Chapter 1.
7. Before starting production, the Contractor shall await the final review of shop drawings and assembly calculations by the Departmental Representative.
8. The Contractor shall perform all non-destructive tests required to assure the continuity of the welds and to assure that they are without cracks. Test results shall be submitted to the Departmental Representative for review.

2.1 Galvanization

2.1.1 Surface preparation and Galvanization

1. General
 1. The Contractor shall perform the surface preparation and galvanization in accordance with these specifications and vendor recommendations.
 2. All the metal parts must be prepared and hot dip galvanized, including the fasteners.
2. Surface Preparation
 1. All surfaces must be dry and free of oil, rust, grease, deposit slag, dust, etc. before applying galvanizing.
 2. Raw seams and sharp edges should be smoothed by grinding burrs left by the welding must be removed.
 3. For all other steel components, the surface must undergo stripping, commercial type, Abrasive projection according to SSPC-SP6-85 standard (91).
 4. The surface must be inspected using visual inspection standards like SA 2 SSPC-Vis 1-89.
 5. All cleaned surfaces must be free of scale, rust, oil, grease, paint and other foreign matter that can affect the surface finish.

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3. Galvanization

1. The zinc coating on galvanized surfaces must be of a thickness corresponding to at least 610g / m² and typically at least 800 g / m² for all the elements of the bridge, according to ASTM A123 / 123M-200, A153- 95 A653M96 and CSA G16492.
2. Galvanizing must be performed by hot dip to obtain a continuous layer of zinc, of a uniform thickness that adheres perfectly to all the surfaces of steel and ensures a complete protection of the steel after assembly.
3. Each section shall be galvanized in a single dip and if required, openings must be provided during manufacturing.
4. No machining will be permitted after the galvanization.
5. All surfaces shall be clean and smooth.
6. If required for galvanizing, the contractor may reinforce the sections against warping.

4. Retouching at the jobsite

1. After acceptance by the Departmental Representative of assembled steel structures in whole or in part, the Contractor shall retouch all damaged surfaces.
2. For touching, surface preparation shall be performed by mechanical equipment as specified in SSPC SP3 and visual inspection must be performed as specified in the SSPC Vis 3 standard.
3. All damaged surfaces shall be repaired to the Departmental Representative satisfaction.
4. Retouching galvanized sections shall be done in accordance with ASTM A780 by applying a rich zinc coat containing 80-95% zinc and shall comply with CAN / CGSB1 standard. The Contractor shall apply two coats of "Galvano-Spray 70-45 of Metaflux" or equivalent approved by Departmental Representative, and in accordance with the manufacturer's recommendations.


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5. The Contractor shall apply two coats of the product at 48-hour intervals between the layers and as recommended by the supplier. Fabrication and welding are not permitted after galvanizing without having first obtained the approval of the Departmental Representative.
6. In case of major retouching, the Departmental Representative may demand for the resurfacing by abrasive methods and re-galvanizing the entire section by hot dipping.
 1. Refer also to the section entitled « Surface preparation and Galvanization.
 2. All steel sections shall be completely stripped to bare metal in accordance with SSPC-SP8-92 « Surface Preparation Specification no 8 Pickling » and opening shall be provided in all tubular or closed sections.
 3. The Contractor shall notify the Departmental Representative where the galvanization will take place and shall provide proof of accreditation of the company chosen.
 4. The Departmental Representative reserves the right to reject all warped, veiled, damaged sections, or those that do not meet the requirements of these specifications or the drawings.
 5. Prior to shipping of the first section, the Contractor shall submit to the Departmental Representative a packaging and shipping process for review. No equipment or material can be shipped to the site from the place of manufacture or shipment without the prior authorization of the Departmental Representative.
 6. During off-loading at the site, the Contractor shall verify the condition of the delivered sections in the presence of Departmental Representative. Any lost or defective section must be repaired or replaced by the Contractor.

2.2 Assembling

1. Unless stated otherwise, the Contractor shall design, detail and fabricate assembled parts for the entire supply; the assembled parts shall resist the loads indicated on the drawings in accordance with the requirements of CSA S16-01 and according to these specification.


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2. Les assembling shall be performed at the workshop by arc welding. Welding and inspection shall comply with the requirements of this specification.
3. At the request of the Departmental Representative, the Contractor shall supply the calculations for the welded connections.

2.3 Transporting, handling and warehousing

1. Transporting and handling
 1. The Contractor is responsible for the packing, loading, transport, unloading and handling of the various metal parts, the place of manufacture to the place of assembly. It must, to that end, to ensure that no damage is caused to the parts during handling and transportation.
 2. Prior to shipment of the first section, the Contractor shall submit to the Departmental Representative packing and shipping procedures. No equipment or material can be shipped to the site from the place of manufacture or shipment without prior authorization of the Departmental Representative.
 3. The Contractor shall control his deliveries as needed and must minimize storage on site
 4. Bolts, nuts and washers shall be packed in metal containers with a maximum total weight of 50 kg each. If they are different lengths or diameters, they must first be grouped inside burlap bags and labeled, each containing pieces of one length and one diameter, and then placed in metal containers.
 5. During off-loading at the site, the Departmental Representative shall verify in the presence of the Contractor, the amount and condition of the parts delivered. Any material supplied defective should be repaired or replaced by the Contractor at his own expense and to the satisfaction of the Departmental Representative.
 6. In the event that a damaged part cannot be repaired on site, additional costs of transport and handling are the responsibility of the Contractor.

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2. Warehousing

1. The Contractor shall be responsible at all times for the safe storage of the components of the various metal parts. Any equipment lost or damaged must be replaced or repaired at the expense of the Contractor to the satisfaction of the Departmental Representative.

3. Installation of miscellaneous metallic sections

1. Before installation, all metal sections shall be cleaned to remove grease, dust, concrete, and all materials that can prevent perfect adherence.
2. The metal parts must be installed precisely according to the alignments shown on the drawings with a tolerance of ± 3 mm. All sections must be kept firmly in place during installation, by means accepted by Departmental Representative, in order to prevent any movement.
3. All anchor bolts must be positioned accurately to a tolerance of ± 3 mm in all directions after installation and must be firmly held in place during installation.
4. All damaged galvanized surfaces must be repaired.
5. The steel sections must be cut at the locations as indicated on the drawings.
6. The bolts shall be tightened and checked in accordance with CAN / CSA-S16.1 standard. All tightened and checked bolts shall be clearly identified.
7. All pneumatic wrenches used must be calibrated at least once a day according to a method proposed by the Contractor.