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TECHNICAL SPECIFICATION



Parcs Canada Parks Canada

CHAMBLY LOCK NO. 5

Gates Replacement of the Chambly Canal
and Replacement of the Wooden Right Bank Wall



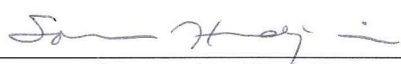
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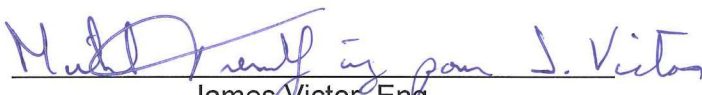
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- APPENDIX C Quantity Take-off**

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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 060573** – Wood Treatment
6. **Section 065000** – Lock Gates

1.2 Work Covered by Contract Documents


1. Work of this Contract comprises the replacement of Lock No.5 gates and related civil works.

1.3 Contract Method

1. The work shall be as per stipulated price contract.


1.4 Scope of Work

1. First, the works shall include but not limited to :
 1. The replacement of the existing gates at Lock No. 5 and the related civil works.
 2. The transportation and unloading of the materials kept by Parks Canada at Chambly. Contractor shall recuperate and pass on to Parks Canada metallic hardware and other mechanical parts of existing gates.
 3. All the labor, materials and the equipment required to complete the work as well as all the accessories or devices not specifically mentioned in the technical specification but necessary for the functioning of the equipment.

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SECTION 011100 – SUMMARY OF WORKS


2. Second, the works shall include :
 1. A joint visit (Contractor/Departmental Representative) in order for the Contractor to assess the nature of the works and to evaluate the available space near the lock to complete the works.
 2. The supply and fabrication of the gates, sluice gates and other parts as shown on drawings and the transportation of the materials/equipments to site.
 3. The supply, fabrication and transportation of 4 additional sluice gates, including the guides and sills.
 4. Dismantling and disposal of the existing gates.
 5. Dismantling and rehabilitation of the handrails (excluding the one on the top of the doors), walkways, upper pivots and counterweights of the gates.
 6. Dismantling and paint touch-ups of the sluice gates operation mechanisms.
 7. Dewatering of the locks.
 8. Repair works of the lock's slabs to enable the installation of the new gate shoes.
 9. The replacement of the existing pivots' straps with adjustable straps by means of threaded rods. The strap anchor plates on the deck shall be replaced with new ones.
 10. Cleaning and painting of the gate guides.
 11. Repair works of the rack and pinion pits. The Contractor shall make a complete survey of the existing pits before starting the works.
 12. Installation of the lock gates, handrails, walkways, sluice gates and other components. Sluice gates' operation mechanisms will be installed by Parks Canada. A new set of handrails for the new doors will be provided by Parks Canada and shall be installed by the Contractor.
 13. Replacement of the rack and pinion pits' deckings.
 14. Wood treatment and painting of steel parts.

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SECTION 011100 – SUMMARY OF WORKS


15. The cleaning and reorganization of the site. Leftover materials shall be disposed out of Parks Canada's property.
16. A maintenance visit should be done after the opening of the canal in May. During this visit, the Contractor shall adjust the opening of the doors. The work will be done in collaboration with Parks Canada on a 2-day period (8 hours per day) during the week days. The adjustment of the straps tension and the installation of shims behind the shoes shall be performed.

 In order to estimate the cost for this visit, the Contractor shall provide 3 men (1 foreman, 1 carpenter and 1 worker) for the 2 days' visit. The costs shall include all fees (transportation, accommodation and expenses). Hydraulic jacks shall be provided by the Contractor in order to bring to level the gates and make the required adjustments.
3. Thirdly, the works shall include (exclusively at Lock No. 8)
 1. Repair works of the walls and slabs of the rack and the pinion pits of lock No. 8 as shown on the drawings.
4. Fourthly, the works shall include the supply of the following documentation for approval by the Departmental Representative :
 1. Drawings showing on site location of the equipments and machinery required for execution of the works (trailers, crane, temporary access and walkway, fences, etc.)
 2. Replacement method of the lock gates, sills and gate guides. The method shall clearly explain how the final cut of the gate ends will be done in order to have an adequate watertightness between the gates.
 3. A complete survey of the existing rack and pinion pits. This survey shall include the position of the anchors of the capstan, capstans' bases and rollers.
 4. Shop drawings sealed and signed by an Engineer, member of the "*Ordre des Ingénieurs du Québec*" (OIQ).
 5. Technical data sheets of the products used for the fabrication and the installation of the equipments (grout, anchors, hardware, lubricants, paint, etc.)

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SECTION 011100 – SUMMARY OF WORKS

6. A certificate to Departmental Representative confirming that the lumber has been dried as required before proceeding with the CCA treatment.
7. A certificate confirming that the wood treatment has been done as per this technical specification.
8. Inspection and test plan for fabrication quality control.
9. Material conformity reports and quality control reports.
10. Health and Safety Plan.
11. Environmental Protection Plan.
12. End project manual.
13. Work Schedule.
5. Fifthly, the works shall include the replacement of the right bank wooden wall of Lock No. 5:
 1. The Contractor shall supply detailed method for replacing the wooden wall;
 2. The two rows of wooden wall shall be replaced by new BC Fir timber respecting the original dimensions;
 3. The top wooden layer must be in perfect contact with the lower masonry stones; the use of grout is permitted;
 4. The existing anchor dowels shall be reused, as much as possible; the Contractor shall make sure that the anchor dowels are not damaged during the removal of existing wood sections and if damaged the Contractor shall make good or replace the damaged anchor dowels;
 5. The Contractor shall supply a unit price for removing and replacing existing damaged anchor dowels; the price shall include supply, transport, installation and all the cost associated with the new anchors;
 6. The Contractor shall undertake all necessary safety measures for the personnel doing the work at all times. The construction method should be submitted with a section dealing specifically with safety and security;

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SECTION 011100 – SUMMARY OF WORKS


7. All equipment that are in the way of the construction shall be dismantled with care and warehoused and reinstalled in the original position;
8. The work zone in the canal shall always be dewatered and kept dry;
9. Once the Departmental Representative accepts and approves the construction method, the Contractor is still responsible for the completion of the work according to the technical specifications and drawings.

1.5 Contractor's Use of Premises

1. Site will be available to Contractor after lock shutdown, which is at Thanksgiving Day. Work on site shall then be executed during the fall and winter until the re-opening of the locks in the month of May.
2. Unrestricted use of site until Substantial Progress.
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 works, the condition of existing work shall be made as good as before or better than the original existing 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;

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SECTION 011100 – SUMMARY OF WORKS

8. Copy of Approved Work Schedule;
9. Health and Safety Plan and Other Safety Related Documents;
10. Environmental Protection Plan.

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SECTION 013300 – SUBMITTAL PROCEDURES

013300 – SUBMITTAL PROCEDURES


1 GENERAL

1.1 Administrative

1. Submit to Departmental Representative the required documents and samples 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 shall 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.


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.

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SECTION 013300 – SUBMITTAL PROCEDURES

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.
8. Submissions include :
 1. Date and revision dates;
 2. Project title and number;
 3. Name and address of:
 1. Subcontractor;
 2. Supplier;
 3. Manufacturer.

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SECTION 013300 – SUBMITTAL PROCEDURES

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. Norms;
 5. Relationship to adjacent work.
9. After Departmental Representative's review, distribute copies of shop drawings and fact sheets.
10. Submit an electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
11. 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.
12. 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.
13. Submit reports of the testing and verification performed by the manufacturer's representative to confirm compliance of materials, equipment or systems installed according to the manufacturer's standards or instructions.
14. Supplement standard information to provide details applicable to project.

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SECTION 013300 – SUBMITTAL PROCEDURES

15. 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. In case shop drawings are rejected, the Contractor shall correct their copies according to the annotation of and the corrected copies shall be submitted for review and approval prior to work commencement.

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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 powerlines 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; 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. 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. The use of construction equipment with vegetable oil hydraulic system is permitted from the bottom of the lock.
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

2. 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. **Section 065000** – Lock Gates

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 reinspection.

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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.


1.8 Quality Control at Site and in Shop

1. The Contractor is responsible to do all necessary controls in order to verify and demonstrate that the parts for the doors fabrication are conform with the drawings and that the tolerances are respected.

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SECTION 014500 – QUALITY CONTROL

2. The Contractor is responsible for all controls and surveys in order to demonstrate the installation of the doors on site is respecting the specified tolerances. .

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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.
2. Contractor shall provide, install and maintain the bikeway detour signage during the Works. Detour path shall be established in collaboration with Parks Canada and in no instances shall the public road be completely closed.

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SECTION 015200 – CONSTRUCTION FACILITIES

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.
4. Do not stack store new or salvaged material 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. Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.

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SECTION 016100 – COMMON PRODUCT REQUIREMENTS

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

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 during execution of the Work. Maintain efficient and continuous supervision of workers.
2. The Contractor is responsible for overseeing the proper progress of the work.

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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 a record of 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 resulting from orders given in the field.
5. After Work completion and before the final inspection, record 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 submit project completion 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 the end of each working day.
3. Use only cleaning materials recommended by manufacturer of surface requiring cleaning, and as recommended by the cleaning material manufacturer.
4. Schedule cleaning operations so that resulting dust, debris and other contaminants do not adhere to fresh newly painted surfaces.

1.2 Final Cleaning

1. When Work is Substantially Advanced remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
2. Remove waste products and debris and leave the area clean and fit for occupancy.
3. Clean lighting reflectors, lenses, and other lighting surfaces.
4. Sweep and wash curbs, walks, steps and other surfaces; sweep or rake clean the remaining area.
5. Repair the lawn and sod 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

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

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SECTION 031000 – 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.
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.

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SECTION 031000 – FORMWORK FOR CONCRETE

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.
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.

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SECTION 031000 – FORMWORK FOR CONCRETE

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 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.

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SECTION 031000 – FORMWORK FOR CONCRETE

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

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SECTION 032000 – REINFORCING BARS FOR CONCRETE

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.
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 of the sills and slabs of the lock to guarantee the proper installation of the shoe of the gates at the desired elevation, as well as the concrete repair works located at the straps' anchor plates, as well as the concrete repair works of the rack and pinion pits.


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.


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SECTION 033000 – CAST IN PLACE CONCRETE

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.
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.

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SECTION 033000 – CAST IN PLACE CONCRETE

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.


3 CONCRETE PLACEMENT

3.1 Preparation

1. Prepare the areas to be concreted as specified on the drawings. Remove all loose materials and the existing concrete debris preserving the existing reinforcing bars as shown on the drawings. Clean the reinforcing bars and existing surfaces.
2. The mechanical sections shall be installed in such a manner that they cannot move during the placing of concrete. They should be solidly fixed to the existing concrete or the formwork.

3.2 Execution

1. Execute concrete placement according to CSA A23.1/A23.2.
 1. The concreting levels of the locks' slab shall be determined according to the height of the new gates after their fabrication taking as reference datum the top elevation of the new gate.
 2. Cold weather concrete placing shall be according to CSA A23.1/A23.2.
 3. No vibrator shall touch the mechanical sections.
2. Finish
 1. The surfaces without formwork shall be finished respecting the given elevations and in no instance shall the irregularities shall exceed 1 mm underneath the shoe; grind if necessary.
 2. 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.
 3. The vertical difference between the existing and new concrete shall not be more than 3 mm.


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SECTION 033000 – CAST IN PLACE CONCRETE

4. The concrete surface at the anchor plate location shall be of stamp concrete in order to look like the surrounding existing rocks. Edges and corners should be similar to the existing rocks.
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.
 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. The inspection and tests of concrete will be done by a laboratory designated by the Contractor according to CSA A23.1/A23.2.
2. Replace all concrete that do not meet the criteria of the technical specifications.

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SECTION 033000 – CAST IN PLACE CONCRETE

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 060573 – WOOD TREATMENT

060573 – WOOD TREATMENT

1 GENERAL

1.1 Related Requirements


1. **Section 065000** – Lock Gates

1.2 References

1. American Wood-Preservers' Association (AWPA)
 1. AWPA M2, Standard for Inspection of Treated Wood Products.
 2. AWPA M4, Standard for the Care of Preservative – Treated Wood Products.
 3. AWPA A3, Standard Methods for Determining Penetration of Preservatives and Fire Retardants
2. Canadian Standards Association (CSA International)
 1. CSA O80 Serie-08, Wood preservation.

1.3 Action and Informational Submittals

1. Submit Submittal submissions: in accordance with Section 013300 - Submittal Procedure.
2. Quality assurance submittals.
 1. For products treated with preservative by pressure impregnation submit following information certified by authorized signing officer of treatment plant:
 1. Information listed in AWPA M2 and revisions specified in CSA O80 Series, Supplementary Requirement to AWPA M2 applicable to specified treatment.
 2. Moisture content after drying following treatment with water-borne preservative.

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SECTION 060573 – WOOD TREATMENT

1.4 Quality Assurance

1. Plant inspection of products treated with preservative by pressure impregnation will be carried out by designated testing laboratory to AWPA M2, and revisions specified in CSA O80 Series, Supplementary Requirements to AWPA M2.
2. As required by standard CSA O80, lumber treated with CCA must be subjected to a chromotropic acid test to verify fixation of the product. This test must be done as per standard AWPA A3 and the additional requirements stated in CSA O80.
3. Plant inspection of products treated with preservative must be done by a third party at the cost of Contractor or treatment plant.

2 PRODUCTS


2.1 Materials

1. CCA preservative (Chromated Copper Arsenate), conform to standard CSA 080.08.

3 EXECUTION

3.1 Preservation Treatment

1. After drying, lumber shall be incised and treated in plant by pressure impregnation with CCA preservative. Treatment shall be done over a minimum of 24-hour period at 700 kPa. Lumber must be treated on four faces after it has been shaped to its final dimension.
2. Provide a certificate confirming that lumber has been treated in plant in accordance with technical specification and standard CSA O80.
3. Works shall be done by a specialized Contractor certified by the « *Canadian Wood Preservation Certification Authority* ».
4. In field or in workshop, all cuts and holes done after initial treatment shall be treated with concentrated CCA.

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SECTION 060573 – WOOD TREATMENT

3.2 Field Treatment

1. CCA must be manipulated and stored carefully since it is a hazardous material.
2. Inform workers to take safety precautions.
3. Comply with AWPA M4 and revisions specified in CSA O80 Series, Supplementary Requirements to AWPA M2.
4. Ensure wood is dried in the application zone.
5. Do not apply preservative when it's raining.
6. Fit out work zones in order to prevent rejects in the environment.
7. Work over protective canvas to prevent spills or drops that could be spilled into environment.
8. Containers shall be well identified, watertight and correctly closed. For temporary storage, containers shall be placed over stable ground, away from vehicles and protected from bad weather.
9. Adopt good practices in order to minimize quantity used.
10. Mop up excessive products and dispose absorbents correctly.
11. Recuperate spills, even small quantities. Contain contaminated area, clean and remove all contaminated materials and manage in accordance with regulation in force.

3.3 Wood Cut in Field


1. Cut wood over protective canvas or similar dispositive in order to recuperate debris.
2. Store sawdust, wood chips or other treated wood debris in watertight containers or by using equivalent measures to prevent contact with rain water.
3. Make sure that cleaning and elimination of debris are done adequately and promptly.

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SECTION 060573 – WOOD TREATMENT

3.4 Elimination of Treated Wood Debris and Preservatives

1. Workers shall be informed of precautions to take in order to manage wood cuts and debris of treated wood and preservatives applied in field.
2. Make sure that residual matters are placed into appropriate containers and carried to authorized sites.
3. Never burn treated wood, debris or waste contaminated with wood preservative.
4. Eliminate debris, saw dust and treated wood chips in a waste burial site that manage its lixiviation waters or a burial site that has the authorizations for this specific materials.
5. Make sure that all hazardous matters destined for elimination are managed with regulations in force (wood preservative, empty containers, saw dust and wood chips, wet soils, etc.)

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SECTION 065000 – LOCK GATES

065000 – LOCK GATES

1 GENERAL

1.1 Related requirements

1. **Section 011100** – Summary of Works
2. **Section 033000** – Cast-in-place Concrete
3. **Section 060573** – Wood Treatment

1.2 Description

1. This section specifies the requirements related to the supply of Locks No. 5 and No. 8 gates and to the removal and installation of the existing gates as shown on drawings.

1.3 Contractor Responsibility

1. The Contractor is responsible to survey and to validate all dimensions that can affect the design and the realization of the new gates. In case the Contractor finds differences between measured dimensions and the ones shown on drawings, the Contractor shall advise Departmental Representative immediately.


2 PRODUCTS

2.1 Materials

1. Wood


Wood for fabrication of the gates and the sill beams shall conform to the following requirements:

1. White oak: “Select Car Stock” quality as per “National Hardwood Lumber Association”. Lumber shall be free of cracks, holes or equivalent defects on all faces. Knots shall be sound and the heart of the wood shall be solid. Worm holes between 1 mm and 3 mm are acceptable to a limited extent.
2. Douglas fir: “Select Structural” quality as per National Lumber Grades Rules (NLGA), 2003, Article 131. More specifically, Douglas fir lumber shall be free of cracks, holes, crevices or equivalent defects on all faces.

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SECTION 065000 – LOCK GATES

3. Lumber shall be dried up to 25% humidity level before CCA treatment. Drying shall be executed as per best practices; lumber shall be stored in bundles, spaced in order to have a good air circulation on all faces. Lumber shall not be exposed to weather.
 4. The Contractor shall provide a written certification to Departmental Representative confirming that lumber has been dried as requested.
 5. Provide a thickness allowance before drying in order to respect final dimensions after planning of lumber on all faces.
2. Bolts – Rods
 1. Conform to ASTM A307 standard.
 2. Mechanical bolts shall be hot dip galvanized, including washers and nuts.
 3. Countersunk bolts shall be hot dip galvanized including washers and nuts.
 4. Threaded rods shall be hot dip galvanized including washers and nuts.
 5. Stainless steel screws shall conform to ASTM A276 (grade 304).
 3. Steel Sections – Fabricated Metal
 1. Conform to G40.21 grade 300W.
 2. Stainless steel parts shall conform to ASTM A276, grade 316.
 4. Cast Steel
 1. Shall conform to ASTM A27, grade N-1.
 2. All cast steel sections shall be true to pattern, well finished, homogeneous and without blow-holes, porosities, hard spots, shrinkage defects, cracks or other visual defects. Surfaces of casting that are not machined shall be free of foundry irregularities, projections, edges, cavities, screenings, picots marks or burin marks so that they will not require smoothing operations prior to painting.

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3. Cast steel sections shall not be repaired without prior acceptance of the Departmental Representative. Acceptance shall be denied if the repair will affect the strength, the machining or the functionality of the section. No process other than welding will be allowed to repair castings. Repair welding shall not be accepted after the final thermal treatment.

5. Sluice Gates Bearing Bars

1. UHMW (Ultra High Molecular Weight Polyethylene).

6. Lower pivots friction washers

1. Bronze ASTM B21, UNS C46400, H02.

2.2 Preservative

1. CCA preservative (chromated copper arsenate), conform to standard CSA 080.08. Provide eight additional litres for “Parks Canada” usage.

2.3 Paint

1. Primer: “Intershield 300” aluminum color fabricated by “International Paint” or equivalent approved by the Engineer.
2. Paint: “Interguard 377” black color fabricated by “International Paint” or equivalent approved by the Engineer.
3. Top coat for the part not in contact with the water in the canal: Interthane 990HS by « *International Paint* » or equivalent approved by the Engineer.
4. Provide two additional litres of primer and paint for “Parks Canada” usage.


3 EXECUTION

3.1 General

1. Shape sections for each pair of gates (a left gate and a right gate for each pair).

3.2 Wood Parts

1. Plane, cut, trim and round off wood parts as shown on the drawings.
2. Groove, mortise, drill, bore and countersink wood parts at the locations as shown on the drawings.

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SECTION 065000 – LOCK GATES

3.3 Wood Treatment

1. Treat wood as per Section 060573 – Wood Treatment.

3.4 Lay Screws

1. For the lay screws, drill holes of required diameter and length for the threaded and non-threaded part. Lay screws shall be screwed with a wrench and shall not be installed with a hammer.

3.5 Steel Sections


1. Cut as indicated on the drawings.
2. Drill and countersink as indicated on drawings.
3. Install flush where required.
4. Grind sharp edges exposed to pedestrians.

3.6 Handrails and Catwalks

1. Existing catwalks shall be recuperated so they can be installed on the new gates.
2. Catwalk metallic parts shall be painted according to the present technical specifications.
3. Parks Canada will provide new door handrails (excluding the one on the catwalks). The new handrails shall be installed by the Contractor.
4. Contractor shall provide new hardware in order to install door handrails and catwalk on the new gates.

3.7 Pivots

1. Existing upper pivots shall be recuperated for installation on the new doors. If the pivots can't be recuperated due to their deterioration, then new pivots shall be provided.
2. Lower pivots are not recuperated; the Contractor shall provide new ones.
3. Parks Canada can provide the moulds for the fabrication of new pivots. The Contractor shall verify the dimensions of the moulds to ensure that they can allow the fabrication of new pivots that respect the dimensions shown on the drawings.

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4. The Contractor shall provide, in option, price for the supply of an upper pivot with and without the use of the existing moulds.
5. The Contractor shall provide, in option, price for the supply of a lower pivot without the use of the existing mould.
6. A credit is applicable in case the moulds are not returned to Parks Canada.
7. Pivots shall be painted as required in the present technical specifications.
8. Adjust and install pivots on the new doors.

3.8 Shoes

1. Install new shoes as per Section 033000 – Cast-in-place concrete.

3.9 Sluice Gate Opening Mechanism


1. The mechanism shall be painted as per requirements of the present technical specifications.
2. The mechanism shall be greased.
3. The upper part of the vertical stem on the existing sluice gate (connection with the opening mechanism) shall be recuperated and installed on the new sluice gates.

3.10 Rack and Pinion Pits Decking

1. Rack and pinion pits decking shall be replaced with new treated wood decking.

3.11 Upper Pivots Straps Replacement

1. Upper pivots straps shall be replaced as per indications shown on drawings.
2. The embedded parts (anchor plates) on the lock deck shall also be modified or replaced to accommodate new strap design as per indications shown on drawings.
3. Anchors used for the strap embedded parts on lock deck shall be 1 inch diameter and embedment length of 300 mm. Total anchor length is 450 mm.

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SECTION 065000 – LOCK GATES

3.12 Painting

3.12.1 Lower pivots, Walkways, Gate Steel Guides and Counterweights, Steel Parts fixed on the door (excluding stainless steel).

1. Sandblast as per SSPC-SP10.
2. First, apply a primer coat of 10 mils (dry) film thickness followed by a black paint coat of 10 mils (dry).
3. Sanding and painting of the steel guides shall be done under a heated shelter at 20°C.

3.12.2 Handrails, Upper Pivots, Straps and Anchor Plates


1. Sandblast as per SSPC-SP10.
2. Apply a primer coat of 6 mils dry followed by a black paint coat of 10 mils dry.
3. Apply a final top coat of polyurethane of 2 to 3 mils dry..

3.12.3 Sluice Gates Opening Mechanism

1. Sluice gates' opening mechanism shall not be entirely painted. Paint touch-ups shall be done where necessary.
2. Surface preparation shall be done with power tools in accordance with SSPC – SP2.
3. Apply a primer coat of 10 mils (dry) film thickness followed by a black paint coat of 10 mils (dry). Apply a final top coat of polyurethane of 2 to 3 mils (dry).

3.13 Gate Installation and Adjustment

1. Transport gates on site and install them at required location.
2. Carefully adjust gate ends near the lock walls.
3. Cut, adjust and finish the gates at their central junction point.
4. Gates shall be watertight when closed. Contractor shall do appropriate adjustments and corrections until adequate watertightness is obtained.

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SECTION 065000 – LOCK GATES

3.14 Tolerances


1. Verticality over gate height shall be ± 10 mm.

3.15 Gates and Operation Mechanisms

1. Install the gates operation mechanisms (capstan), sluice gates and sluice gates operation mechanisms as indicated on drawings.


3.16 Performance Tests Site

1. After the installation and adjustments, the Contractor shall do a performance test at site, under the presence of the Departmental Representative, in order to demonstrate that the equipment function properly.

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APPENDIX A

PHOTOGRAPHS –UPSTREAM GATES

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Photograph 1 - Left Gate


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Photograph 2 - Right Bank Slide Gate



Photograph 3 - Upstream Side of the Canal


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Photograph 4 - Sill



Photograph 5 - Downstream Face of the Gate


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Photograph 6 - Upper Pivot and Straps



Photograph 7 - Strap Attach System (Left Bank)


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Photograph 8 - Rack and Pinion Pit (Right Bank)




Photograph 9 - Decking Attach Chain

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APPENDIX B

PHOTOGRAPH –DOWNSTREAM GATES


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Photograph 1 - Upstream Face of the Gate



Photograph 2 - Downstream Face of the Gate

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Photograph 3 - Opening Mechanism - Right Gate



Photograph 4- Opening Mechanism - Left Gate



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Photo 5 - Sill

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APPENDIX C

QUANTITY TAKE-OFF

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QUANTITY TAKE-OFF

Item	Work Description	Quantity	Unit	Price	
				Lock No. 5	Lock No. 8
1	Mobilisation (Fall period)	1	Lot		N/A
2	Dismantling of the existing gates				
	a) Gate removal (2 pairs per lock)	2	Pair		N/A
	b) Removal and rehabilitation of the handrails and walkways	2	Lot		N/A
	c) Removal and rehabilitation of the pivots and the gate counterweights	2	Lot		N/A
	d) Removal and paint touch-ups of the sluice gates operation mechanisms	2	Pair		N/A
	e) Disposal of the existing gates (2 pairs per lock) and demobilization	2	Pair		N/A
3	Removal, supply and installation of the upper pivots straps	4	Lot		N/A
4	Repair works for the supply and installation of the new upper pivots straps anchor plates	4	Lot		N/A
5	Dewatering of the locks	1	Lot		N/A
6	Repair of the lock's slabs to enable the installation of the new gate shoes	4	Lot		N/A
7	Survey of existing rack and pinion pits	4	Lot		N/A
8	Replacement of the rack and pinion pits' deck	4	Lot		N/A
9	Repair works of the rack and pinion pit	4	Lot		N/A
10	Fabrication and transportation of a lock door set, sluice gates and other component	2	Pair		N/A
11	Supply and transportation of 4 additional sluice gates	4	Lot	N/A	
12	Sanding and painting of the gate guides.	4	Lot		N/A
13	Installation of the gates, walways, sluice gates, handrails and other components	2	Lot		N/A
14	Demolition works under the Lock No. 8 captans	4	Lot	N/A	
15	Replacement of wooden wall	1	Lot		N/A
16	Commissioning	1	Lot		N/A
17	Service visit	1	Lot		N/A
18	Option upper pivot (with the reusing of the existing mould)	1	Unit		N/A
	TOTAL				
19	Option upper pivot (without the reusing of the existing mould)	1	Unit		N/A
20	Option lower pivot (without the reusing of the existing mould)	1	Unit		N/A
21	Unit price for replacing existing anchor dowel	1	Unit		N/A