

REPAIR OF LOCK #9 DU CHAMBLY CANAL

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SUMMARY OF WORK

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 52 01 *Mechanical Works*
- .2 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .3 Section 03 10 00 *Concrete Forming and Accessories*
- .4 Section 03 20 00 *Concrete Reinforcing*
- .5 Section 03 30 00 *Cast in Place Concrete*
- .6 Section 04 03 07 *Historic - Masonry Repointing*
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- .28 Section 26 28 23 *Disconnect Switches: Fused and Non-Fused*
- .29 Section 26 52 13.13 *Emergency Lighting*

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SUMMARY OF WORK

- .30 Section 26 52 13.16 *Exit Signs*
- .31 Annex I Mitigation Measures

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work covered by this Contract includes the repair works of the lock #9 of the Chambly Canal as well as related civil works.

1.3 CONTRACT METHOD

- .1 Repair works are subject to lump sum and unit prices, in accordance with the payment items presented in the Price Form.

1.4 SCOPE OF WORK

- .1 The work covered by this contract shall included but not be limited:
 - .1 Supply, installation and removing of cofferdams;
 - .2 Drying and dry maintenance of the lock including lock approaches;
 - .3 Removal of sludge, mussels and other waste on the bottom of the lock;
 - .4 Replacement of the lock doors including the footbridges;
 - .5 Reinforcement of the lock thresholds;
 - .6 Replacement of mechanisms for doors and gate valves of the lock including removal of the existing hydraulic system, removal of the existing automation system, supply and installation of new manual mechanisms;
 - .7 Upgrading of the electrical system of the lock including the modification of the electrical distribution in the main electrical room, various works in the main electrical room and the Lockmaster's stall, the relocation of loads in an existing panel, the upgrade of schedule panels, the modification of the upstream and downstream operators' consoles, as well as various works;
 - .8 Various maintenance work on the lock;
 - .9 Survey of the lock;
 - .10 Cleaning and reorganization of the site as well as removal of leftover materials out of Parks Canada's property;
 - .11 All labour, materials and equipment required to complete works;
 - .12 Service visits to demonstrate the proper operation of the new doors and new equipment for the manual operation of the lock;
 - .13 Dismantling of the hydraulic unit including all components: tank, motors, pumps, valves, cylinders, hydraulic lines including those that pass under the lock, electrical connection, control panel, support, etc.
 - .14 Dismantling and installation of the new door opening mechanisms including the racks and their fasteners on the doors.
 - .15 Dismantling and installation of the valve opening mechanisms including the fixing of the wood studs on the doors to the site (the mechanisms will already be pre-assembled on the wood studs).

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SUMMARY OF WORK

- .16 Handing over various equipment to the Agency Representative, at the designated location.

1.5 WORK BY OTHERS

- .1 Not required.

1.6 FUTURE WORK

- .1 Not required.

1.7 WORK SEQUENCE

.1 Deadlines

- .1 General mobilization and construction facilities of the Contractor can not be initiated before October 21th, 2019.
- .2 The work of this contract including the final demobilization shall be completed by April 18th, 2020.

.2 Scheduling

.1 Preparatory work

- .1 At least five (5) business days prior to the kick-off meeting, the Contractor shall have submitted the following documents to the Agency Representative:
 - .1 The work schedule;
 - .2 The site development plan (including site fencing, trailer positioning, parking lots, storage areas, etc.);
 - .3 Temporary signage plans;
 - .4 The Health and Safety Plan;
 - .5 The Contractor Environmental Protection Plan (EPP):
 - .1 In the five (5) working days following the submittal of the Environmental protection plan (EPP) the Agency Representative shall return to the Contractor a reviewed copy of the plan, along with any comments.
 - .6 The plans and procedures for the drying of the lock;
 - .7 Drawings and Procedures for the Installation of Contractor Temporary Works
 - .8 All correspondences emitted for:
 - .1 The « Commission des normes, de l'équité, de la santé et de la sécurité du travail » (CNESST);
 - .2 The city of Saint-Jean-sur-Richelieu;
 - .9 All documents deemed necessary by the Contractor to facilitate an effective kick-off meeting;

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SUMMARY OF WORK

- .10 Once all documents have been submitted and accepted by the Agency Representative, the mobilisation of the work will be permitted.
- .2 In the five (5) business days prior to the kick-off meeting, the Agency Representative shall have enough information to understand the Contractor's intentions in regard to the present contract.
- .3 If any plan emitted by the Contractor shall receive approval by a signing authority, be it private or public, the Contractor is responsible for the submission and approval of said document.
- .4 The documents submitted by the Contractor to the Agency Representative shall follow a logical order, within a sufficient period so as not to delay any work;
 - .1 The Contractor shall foresee a minimum delay of five (5) business days for the examination of the documents emitted by him, to the Agency Representative;
- .5 The Contractor shall, together with the Agency Representative, take a photographic survey of the condition of the site from the beginning of the work at the site.
- .2 Construction work
 - .1 After the 2019 Canal-de-Chambly operating season, a cofferdam will be set up by the Quebec Ministry of Transport (MTQ) in the Chambly Canal at Gouin Bridge.
 - .2 After installation of the cofferdam by the MTQ at the Gouin Bridge, the PCA will lower the water level in the Chambly Canal to about 1 meter from the bottom of the lock # 9. The Contractor must note that a 2-week period is required by the PCA to achieve a gradual lowering of the Chambly Canal. However, throughout the work, the Contractor is responsible for managing the water level between the Gouin Bridge cofferdam and the Lock # 9 site. Water intake is expected due to leaks from the cofferdam, emissaries from the City, rain and melting snow and ice.
 - .3 Following the lowering of the Chambly Canal water level by the PCA, the Contractor must supply and install a cofferdam a few meters upstream from lock # 9 (upstream cofferdam) as well as a cofferdam a few meters downstream of Lock # 9 (downstream cofferdam).
 - .4 After installation of the upstream cofferdam and the downstream cofferdam (by the Contractor), the Contractor shall proceed to pumping to lower the water level to 600 mm from the bottom of lock # 9 so as to allow a firm mandated by the PCA to remove captive fish between the upstream cofferdam and the downstream cofferdam. The following items are to be considered:
 - .1 Two (2) business days are required for the remove of the captive fish.

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SUMMARY OF WORK

- .2 The removal of captive fish must be done before the formation of an ice cover in the fall of 2019.
 - .3 The Contractor must provide access to the firm that will remove the fish, ensure their safety and provide lifting equipment for the fish traps.
 - .4 This firm engaged by the PCA will perform only one (1) mobilization. The contractor must ensure that the construction of all cofferdams is completed before the firm is mobilized. Otherwise, the contractor will be responsible for picking fish at his own expense.
 - .5 After the removal of the fish by the PCA, the Contractor will be able to dry the lock # 9.
 - .6 The Contractor is responsible for the sequence of repairs to lock # 9.
 - .7 The Contractor must schedule a service visit to demonstrate to the PCA and its representatives the proper operation of the new lock gates in dry dock conditions.
 - .8 After the rehabilitation of lock # 9, the Contractor must coordinate with the PCA the raising of the water level of the Chambly Canal and thus allow the removal of the cofferdam preventing the arrival of water from the Richelieu River. The Contractor must provide that a period of 2 weeks is required by the PCA to achieve a gradual raising of the Chambly Canal.
 - .9 The Contractor must schedule a service visit to demonstrate to the PCA and its representatives that the new lock gates are functioning at least 2 weeks after the Chambly Canal is re-opened.
- .3 Elements to consider during planning
- .1 The Contractor's work must be coordinated with the work of the PCA.
 - .2 The works shall be executed from Monday to Friday, between 7h30AM and 6h00PM, respecting the requirements of the town of Saint-Jean-sur-Richelieu.
 - .3 The Contractor shall establish its schedule considering the days that will be lost due to unfavorable weather conditions. The PCA will not grant the Contractor any extension of time if the climatic conditions are not favorable for the execution of the work.
 - .4 The Contractor shall inquire into applicable safety regulations which may have a negative impact on the Contractor's planning and schedule. The PCA will not grant to the Contractor any delay in terms of the imposition of restrictions, regulations, or safety directives, including by the CNESST.
 - .5 The Contractor will always have the obligation and responsibility to plan all activities by providing for the use of manpower, materials, tools and working methods to carry out the work in accordance with the terms and conditions of this contract and at the rate of advancement to ensure completion within the allotted period stipulates in the Contract.

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SUMMARY OF WORK

- .6 The Contractor shall provide for approval his methods of execution of work prior to mobilisation;
- .7 Unless otherwise specified, the Contractor shall be responsible for the design, supply, installation and dismantling upon completion of works of all equipment and temporary structures required to perform the work. Any design or drawings for equipment or temporary structures shall be signed and sealed by a qualified engineer who is a member of the “*Ordre des Ingénieurs du Québec*” (OIQ). The Contractor's engineer shall also provide the certificates of conformity of equipment and temporary works set up for the work.
- .8 Work under the high level of the canal and cofferdam removal must be completed no later than April 11, 2020.
- .9 The revision of all documents and plans submitted by the Contractor to the Agency Representative does not, in any way, relieve the Contractor of his responsibilities, with regards to any errors or omissions contained in the documents, or in the Contractor's obligations to fulfill contractual requirements, unless otherwise indicated on the documents submitted that the Agency Representative has accepted such an exemption.
- .10 The Contractor shall take the necessary measures to ensure the safety of the personnel during the work. The construction method shall include a section on safety.
- .11 The Contractor shall provide adequate temporary shelter and heating if the concrete and/or the painting is placed/applied during the winter period.
- .12 The Contractor shall take in to account the time required for the supply of equipment and materials for the execution of the work.
- .13 The Contractor must always ensure free passage of visitors on the upstream or downstream gateway. Provide for pedestrians, bicycles and people with reduced mobility. Provide security fencing on each side of the access to guide visitors and ensure their safety. The Contractor must provide sign plans for both upstream access and downstream access.
- .14 The Contractor shall not obstruct neither circulation routes nor the bicycle path during the works.
- .15 The Contractor shall find the parking required for the performance of the Work under this Contract and include all costs in the prices tendered to the corresponding payment items in the Price Schedule.
- .16 Considering the importance of archaeological potential of the site near the Chambly Canal, the Contractor shall install in all the zones in which heavy machinery circulates (with geotextile and backfill) and return their condition to equivalent or better than the condition it presented before the start of the work.
- .17 During the bidding period, the Contractor shall visit and examine the site and conditions relating to perform the work.

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SUMMARY OF WORK

- .18 Unless otherwise indicated in this section of the specifications, the restoration of Lock # 9 must be done under dry dock conditions and must include, but not be limited to:
- .1 The installation by the Contractor of the cofferdams required for the repairs to lock # 9:
 - .1 A cofferdam at the cofferdam grooves approximately 5 meters upstream of the upstream lock #9 gates;
 - .2 One or more cofferdams downstream of the downstream gates of lock # 9 to carry out all work in dry dock downstream of the lock;
 - .3 Any other cofferdam required to allow work in dry dock conditions in the Chambly Canal.
 - .2 Upstream of the cofferdam located approximately 5 meters upstream from the upstream gates of lock # 9 (upstream reach), the water level of the Chambly Canal must allow fish to survive.
 - .1 With the cofferdam upstream of the Gouin Bridge (set up by the MTQ), the minimum water level of the reach must be 0.5 meters above the elevation of the top of the upstream threshold of the lock # 9 (minimum level for fish).
 - .3 The installation of the cofferdam by the Contractor to prevent the water between locks # 8 and # 9 (downstream reach) from returning to the dry zone. The height of the downstream cofferdam must allow the personnel provided by the PCA to manually handle fish containers over this cofferdam. Otherwise, the Contractor must provide, at his own expense, a crane to circulate the fish containers over the cofferdam;
 - .4 Pumping and maintenance, by the Contractor, to achieve dry dock conditions;
 - .5 The removal of sludge, mussels, and other waste from the bottom of the lock and the storage, characterization and disposal of such waste in accordance with applicable laws;
 - .6 For work to be performed downstream of the downstream gates, the Contractor must consider that after the lowering of the water level in the reach, the top of the water will be 0.3 meters above the top of the downstream threshold of lock # 9;
 - .7 The refecton works of the lock # 9 which are located upstream of the upstream doors can be made in water and / or from scaffolds resting at the bottom of Canal Chambly.
- .19 The Contractor shall also provide for the validation or on-site survey of all dimensions, slopes and other information necessary for the execution of the work. In the event that the Contractor notices differences between the measured values and those shown on the drawings, he shall inform

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SUMMARY OF WORK

the Agency Representative, who will indicate the procedures to be followed.

- .20 The Contractor must provide the time required to the cure of new materials that will be submerged following the re-watering of the Chambly Canal.
- .21 The Contractor must install a fence on the entire perimeter of the site. This must be locked outside working hours.

1.8 CONTRACTOR USE OF PREMISES

- .1 The work on the lock site must be carried out outside the Canal operating season and outside the Chambly Canal's preparation periods prior to its opening and following its closure.
- .2 The use of PCA installations (buildings, toilets, energy sources, water sources etc.) is forbidden.
- .3 Identify and pay for the additional work, storage or parking areas required to perform the Work under this Contract.
- .4 Clear snow, heat and deglaze the site according to the work to be done.;
- .5 Do not unduly pile materials or equipment that will obstruct the site access;
- .6 The Contractor shall repair, at his own costs, all damages to the existing structure or premises caused by himself or his sub-contractors, as instructed by the Agency Representative.
- .7 At completion of operations, the condition of existing site shall be equal to or better than that which existed before operations started.

1.9 OWNER OCCUPANCY

- .1 Not required.

1.10 PARTIAL OWNER OCCUPANCY

- .1 Not required.

1.11 PRE-PURCHASED EQUIPMENT

- .1 Not required.

1.12 USE OF ACCESS RAODS

- .1 Execute work with least possible interference to the normal use of the roads, pedestrian path and bicycle path.
- .2 Provide signalers for any vehicle reversing to the site from Champlain Street or on the dike.

1.13 EXISTING SERVICES

- .1 The Contractor shall protect and maintain in service all existing public and municipal utilities (Info-Excavation members or not), whether underground or not, that the Contractor may encounter during his work.

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- .2 Prior to commencing work, the Contractor shall define the extent and location of utility lines in the work area and advise the Agency Representative.
- .3 When non-listed utility lines are discovered, immediately notify the Agency Representative and record them in writing.
- .4 The Contractor shall notify the Agency Representative at least five (5) working days prior to discontinuing utilities. The Contractor shall first have entered agreements and obtained the necessary authorizations from the affected utility companies.
- .5 Leave the visitor free passage on one of the footbridge at all times and ensure a secure and fenced path.
- .6 Construct barriers in accordance with section 01 56 00 – *Temporary Barriers and Enclosures*.

1.14 DOCUMENTS REQUIRED

- .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Accepted data sheets.
 - .7 The certificates of conformity of the materials to be put in place.
 - .8 Change Orders.
 - .9 Other Modifications to Contract.
 - .10 Copy of Approved Work Schedule.
 - .11 Health and Safety Plan and Other Safety Related Documents.
 - .12 Drawings and procedures related to temporary structures, signed and sealed by the Contractor's engineer.
 - .13 Environmental Protection Plan (EPP)
 - .14 Other pertinent documents as specified by the Agency Representative.

Part 2 Products

2.1 NOT REQUIRED

- .1 Not required.

Part 3 Execution

3.1 NOT REQUIRED

- .1 Not required.

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SUMMARY OF WORK

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WORK RESTRICTIONS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
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- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 SUMMARY OF WORK

- .1 In the past, present and future, the Chambly locks site is an important point of convergence. Currently, the City of Saint-Jean-sur-Richelieu and its citizens, the PCA staff and representatives, tourists and other buried service owners occupy the site. The Contractor shall be aware of this and carry out the work in respect of the third parties, occupants or neighbors of the site.
- .2 A summary of the work is available in section 011100 *Summary of Work*.

1.3 ARCHAEOLOGICAL CLAUSES

- .1 Special Conditions:
 - .1 The Canadian National Historic Site, the Chambly Canal was recognized by the Canadian government as one of the sites with the highest heritage value. Therefore, all excavation work recognized as potentially containing historical remains or ruins, should be monitored by an Archaeologist appointed by Parks Canada Agency. As part of this contract, archaeological surveillance is required for the following:
 - .1 excavation work at the back of the right retaining wall upstream of the upstream lock gates;

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WORK RESTRICTIONS

- .2 excavation work at the front of the right retaining wall downstream of the downstream lock gates;
- .3 excavation work at the front of the left retaining wall downstream of the downstream lock gates;
- .4 Excavation work on the new rack pits.
- .2 The Contractor must take into consideration that an archaeologist mandated by the PCA will be present at the site.
- .2 Access and collaboration
 - .1 The Contractor must provide and update a mobilization plan indicating the areas that will be involved in its work as well as the access routes and mobilization zones.
 - .2 The Contractor must provide and update an excavation schedule indicating the excavation days as well as details of the anticipated sectors and hours of work and send it to the Consultant.
 - .1 The Contractor must notify the Government Representative of the excavation work at least seventy-two (72) working hours prior to the intervention to ensure the presence of an archaeologist.
 - .3 The Contractor shall cooperate and comply with all instructions given by the Consultant during excavation works to avoid any loss of archaeological information on the site.
 - .4 The Contractor shall facilitate access to the work site and collaborate with the Archaeologist. The Archaeologist or his representative will be on site as required related to the protection and recording of the historical remains. Their role will be to guide the Contractor to avoid loss of archaeological information and to gather information on the remains.
 - .5 The Contractor shall allow the archaeologist team to conduct examinations and archaeological surveys.
- .3 Archeological discoveries
 - .1 The Contractor shall notify the Consultant or, in his absence, the Archaeologist or his representative of any archaeological discovery (remains of buildings or facilities, objects, and fragments of objects) made on the premises and wait for his written instructions before continuing work in the area of the discovery.
 - .2 Relics, antiques, and other items with some interest from a historical, archaeological, or scientific point of view (remains, object, or fragment of an object) found on the site or in the areas of excavation or demolition remain the property of the Crown. The Contractor shall protect and obtain instructions from the Consultant in this regard.
- .4 Suspension of work
 - .1 The Contractor shall provide in his contract, at his expense, the suspension of work for five (5) minutes for every hour of excavation in all areas requiring the presence of the Archaeologist. These work stoppages, if not used, will be accumulated and can be reused later as needed. A list of the unused time will be

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WORK RESTRICTIONS

- recorded by the Consultant in agreement with the Contractor and the Archaeologist.
- .2 For work stoppages lasting more than 30 minutes, the Consultant will assess the implications of the stoppage and notify the Contractor to that effect. The Contractor may be required to move the machinery to another area to allow the continuation of the archaeologists' work. If reassignment is not possible, the Contractor will be compensated from the bank of hours or if it is used up, according to the agreements made at the first site meeting.
 - .5 Manual excavations for archaeological purposes
 - .1 Given the possibility of archaeological discoveries, the Contractor is advised that during work, manual excavation may be required as well as any work necessary to ensure the protection of discoveries. The Contractor will be compensated according to the agreements made at the first site meeting.
 - .6 Protection of relics and structures
 - .1 The Contractor shall take all reasonable precautions during excavation and other works to protect the excavated remains and to allow their examination by the Archaeologists. Parks Canada Agency will not tolerate any exception in this regard. If by neglect the Contractor deteriorates any relic whatsoever, he will be held responsible and the PCA will determine the implications.
 - .2 In the event where the Consultant authorizes the demolition of elements on site, the Contractor shall take all necessary precautions to ensure protection of the adjacent structures that are not to be demolished. The demolition of elements shall be carried out gradually and in a controlled manner after the archaeological surveys have been completed. If items are damaged during construction works, the Contractor shall immediately notify the Consultant.

1.4 USE OF SITE

- .1 Perform work with minimal disturbance to normal use of Champlain road and bicycle path.
- .2 Where safety has been reduced due to the work, provide other temporary means to ensure the safety of property and persons on the premises.
- .3 Protect structures, equipments and trees by temporary means until permanent closures are installed.
- .4 Protect existing surfaces, install a working cushion (geotextile fabric and backfill at least 100 mm thick) if the Contractor wants to mobilize or circulate outside the paved surfaces to protect these surfaces as well as vestiges, antiques and other elements of historical, archaeological or scientific interest. Remove the work cushion before commissioning the Chambly Canal.
- .5 Rehabilitate damaged grassed areas with grass (roll-out tuft) at the end of the work.
- .6 Make a request to the PCA whenever access is required to enter the stall. This request must be sent at least 24 hours in advance. The stall will not be accessible without a representative of the PCA.

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WORK RESTRICTIONS

1.5 SPECIAL REQUIREMENTS

- .1 Carry out noise generating Work Monday to Friday from 7:30 am to 6:00 pm while respecting the requirements of the City of Saint-Jean-sur-Richelieu .
- .2 Submit schedule in accordance with Section 01 32 16.19- *Construction Progress Schedule - Bar (GANTT) Chart*.
- .3 Ensure Contractor's personnel employed on site know and obey the regulations, including safety, fire, traffic and security regulations.
- .4 Implement Environmental Protection Recommendations Including Appendix I - *Mitigation Measures*.
- .5 Work on the installation of pre-cast slabs on the bottom of the Chambly Canal, as well as the installation of the cofferdams, is subject to a request for review by Fisheries and Oceans Canada (DFO). Any additional requirements requested by DFO must be met.
- .6 Keep within limits of work and access roads. Do not overflow outside the Contractor's mobilization area indicated in RUC-20-212.03.
- .7 Delimit the site with construction fencing.
- .8 The circulation of vehicles or machinery on the bike path is tolerated, but shall be done with the presence of a signalman (on foot) and at a maximum speed of 15 km / h. The Contractor shall also make sure to respect the bearing capacity of the dyke and other facilities it may cross. The Contractor shall minimize his use of the bike path, a maximum of 30 round trips on the bike path may be authorized under this contract. The bike path can not be used during the thaw period. For each vehicle traveling on the dike, the sum of the vehicle and its load must not exceed 20 metric tons.
- .9 Ingress and egress of personal vehicles belonging to the Contractor's workers into the site is prohibited.
- .10 always Provide safe access to allow visitors to cross on upstream or downstream doors. Install construction fences on both sides of the access and install the appropriate signage.
- .11 Protect existing paving arrangements to avoid staining during construction.
- .12 Concerning the cofferdam about 5 meters upstream of the upstream doors of lock # 9, the Contractor should read Annex IV Lock # 9 Geometry. This appendix is for reference only, the Contractor is responsible for the design of all cofferdams required under this contract (unless otherwise specified).

1.6 SECURITY

- .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Consider that the paint of steel elements of the lock contains lead and the wastes resulting from the removal of existing paint shall be considered as hazardous materials.
- .3 Consider that the wooden elements (old and new) of the lock contain Chromated Copper Arsenate (CCA) and that residues from the removal of the paint should be considered as hazardous materials.

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WORK RESTRICTIONS

- Part 2** **Products**
- 2.1** **NOT USED**
- .1 Not Used.

- Part 3** **Execution**
- 3.1** **NOT USED**
- .1 Not Used.

END OF SECTION

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Part 1 General

1.1 DEFINITIONS

- .1 Lump sum: Means that part of the contract where it is stipulated that a global payment (or fixed amount) will be made in consideration for the performance of the work to which it relates. In the case of a lump sum, the quantity corresponding to the Price Form (or Bid Form) is always equal to one (1).

1.2 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Make applications for payment on account monthly as Work progresses.
- .2 Applications for payment shall be dated the last day of the monthly payment period agreed between the Contractor and the Agency Representative at the beginning of the project. The amount requested shall be the value of the work performed at that date.
- .3 Submit to the Agency Representative, at least 10 days before the application for payment the Schedule of values for each item of payment of the Price Form.

1.3 SCHEDULE OF VALUES

- .1 Provide schedule of values supported by evidence as Agency Representative may reasonably demand with respect to supporting documents. Once accepted by the Agency Representative, the schedule of values owed can be used as basis for applications for payment.
- .2 Include statement based on schedule of values with each application for payment.
- .3 Requests for products delivered to Place of Work but not yet incorporated into Work are not payable.

Part 2 DESCRIPTION OF THE PRICE FORM ITEMS

2.1 Unit price or lump sum

- .1 The total amount of the contract is broken down based on a description of the work remunerated on a lump sum basis and work remunerated on a per unit basis. All the works, including those not specifically mentioned in the description of a particular item, shall still be included in the costs of the different fixed or unit items of the Price Form. No additional allocation will be allocated to the Contractor for work shown on plans or described in specifications that are not the subject of a specific item.
- .2 Each unitized or lump sum price shall include all expenses, all work, disbursements, payments, direct or indirect costs, mobilizations, demobilizations and acts, all facts and all responsibilities, obligations, omissions and errors of the Contractor related to the realization of this Contract. These prices also include all corporate overheads: administration, insurance, contributions, interest, rents, taxes and other incidental expenses. It shall include losses and damages that may result from the nature of the work,

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fluctuating prices and salaries, business risks, strikes, delays not attributable to the Parks Canada Agency, transportation restrictions, accidents and the action of the elements of nature.

2.2 Payment measurements

- .1 Bid prices for the Price Form items shall include all labor, equipment and materials required to perform the work as per drawings and specifications and as directed by the Agency Representative including, but not limited to:
 - .1 Coordination and supervision of construction, inspection, test and survey work, engineering and technical work required, and necessary site adjustments and corrections required to ensure performance works according to the rules of the art and the prescriptions of drawings and specifications;
 - .2 Coordination of work with third parties, including the City of Saint-Jean-sur-Richelieu, the public, representatives of the Parks Canada Agency (PCA) and agents of the PCA;
 - .3 Obtaining all the permits required for the execution of the work;
 - .4 All that is necessary to complete the work according to the contractual documents, whether or not the specific elements are mentioned in the specifications, or shown or not shown on the drawings of this Contract;
 - .5 All financing costs, including interest charges;
 - .6 All administrative expenses and profit;
 - .7 The contractual guarantee;
 - .8 All costs arising from the Contractor's special measures for cold weather work, of note including:
 - .1 Preheating;
 - .2 Heating;
 - .3 Insulation cloths/canvas covers, shelters and maintenance of insulation cloths/canvas covers and shelters;
 - .4 Heating equipment and their operation and heating energy;
 - .5 Snow removal;
 - .6 De-icing procedures;
 - .7 All loss of production by work teams.
 - .9 All costs resulting from special measures to be taken by the Contractor for work in hot weather, of note including:
 - .1 Cooling of materials;
 - .2 Wind shields;
 - .10 All costs arising from mobilizations and demobilizations;
 - .11 All costs relating to temporary works, equipment, lifting plans and the Contractor's engineering costs including, in particular, certificates of conformity to be issued by the Contractor's engineer, in accordance with document *Lignes directrices concernant les documents d'ingénierie* of the Ordre des Ingénieurs du Québec (OIQ);

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- .12 All costs arising from special measures to be taken by the Contractor during his work to locate and protect existing structures from damage including coordination with Info-Excavation, the city of Saint-Jean-sur-Richelieu, PCA and other relevant partners;
- .13 All costs arising from transportation of personnel to and from the site;
- .14 All costs arising from transportation, handling and storage;
- .15 All costs arising from galvanizing and painting;
- .16 All costs arising from the presence of lead in the existing paint, the Contractor shall consider that the residues resulting from the removal of the paint are hazardous materials;
- .17 All costs arising from the presence of wood treating agent such as Chromated Copper Arsenate (CCA) in the existing lock wood, the Contractor shall consider that the residues resulting from the removal of the wood are hazardous materials.
- .18 All costs arising from cleaning, removal and disposal of all scrap;
- .19 All costs arising from the supply of the Contractor's drawings including technical data sheets, Contractor's procedures, on-site surveys of existing dimensions, existing slopes and other information necessary for the execution of the work, shop drawings, drawings of temporary works signed and sealed by an engineer member of the *Ordre des ingénieurs du Québec*;
- .20 All costs arising from measures related to health and safety of workers, public and other stakeholders on and around the site;
- .21 All costs arising from protection of the environment.

2.3 The Work under this Contract is payables as follows:

- .1 Item 1 – General
 - .1 Item 1.1 – Site Organization and lock drying
 - .1 Payment item 1.1 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the execution of the Work as well as any other expenses not included in the other *Bid Form* items, in accordance with the requirements of the specifications.
 - .2 The amount includes, but is not limited to, the following:
 - .1 All that is required in the following sections and is not directly attributed or related to one of the other items of the Bid Form:
 - 01 11 00 Summary of Work
 - 01 14 00 Work Restrictions
 - 01 29 00 Payment Procedures
 - 01 31 19 Project Meetings
 - 01 32 16.19 Construction Progress Schedule - Bar (Gantt) Chart
 - 01 33 00 Submittal Procedures
 - 01 35 13.43 Special Project Procedures for Contaminated Sites
 - 01 35 29.06 Health and Safety Requirements

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- 01 35 43 Environmental Procedures
- 01 45 00 Quality Control
- 01 52 00 Construction Facilities
- 01 55 26 Traffic Control
- 01 56 00 Temporary Barriers and Enclosures
- 01 61 00 Product Requirements
- 01 71 00 Examination and Preparation
- 01 73 00 Execution
- 01 74 00 Cleaning
- 01 74 19 Construction/Demolition Waste Management and Disposal
- 01 77 00 Closeout Procedures
- 01 78 00 Closeout Submittals
- .2 The supply of the schedule of execution as well as its updates, drawings, procedures and other documents of the Contractor;
- .3 Implementation of all Environmental Protection recommendations including - Appendix I - Mitigation Measures;
- .4 Protection of the public (construction site fence, security guard, etc.);
- .5 Drying of the Chambly Canal and maintenance of dry holds including control of water, ice and snow;
- .6 After the 2019 Chambly Canal operating season, the cleaning of the bottom of the lock, the removal, storage, characterization and disposal of sludge, zebra mussels and other waste present at the bottom of the lock (for submission, provide for approximately 12,000 liters of waste to be disposed of and consider the waste to be B-C contaminated with hydrocarbon and PAH and C+ for metals);
- .7 The design, supply, installation and removal of all cofferdams required by the Contractor that are not the subject of a specific item in the *Bid Form*;
- .8 Land and / or space rental fees, if any;
- .9 Protection of private properties and existing public properties. If the Contractor damages these properties during his work, he shall repair them at his own expense, to the satisfaction of the PCA Representative;
- .10 The construction and removal of work areas, the repair of grassed areas prior to the start of work with turf patches and the restoration of the site, to the satisfaction of the PCA Representative;
- .11 Rehabilitation such as the existing of reinforced grass areas of the new landscape near the stall and the street;

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- .12 Maintenance of the routes taken by the Contractor, to the satisfaction of the Agency Representative;
 - .13 Supply of the construction facilities;
 - .14 Off-site disposal of waste materials;
 - .15 Contractor's engineering, laboratory and survey costs;
 - .16 Snow and ice removal from the work surfaces and access routes used by the Contractor.
- .3 The submitted price is paid as shown below:
- .1 A first portion up to a maximum of 10 % of the total amount bid for this item and not more than 4% of the total amount bid for items 2 to 4 of the *Bid Form* will be paid when the Contractor has fully completed the work mentioned in paragraph 1.7.2.1 *Preparatory work* of the section 01 11 00 *Summary of Work*.
 - .2 A second portion up to a maximum of 15 % of the total amount bid for this item and not more than 6% of the total amount bid for items 2 to 4 of the *Bid Form* will be paid when the Contractor has fully completed the general mobilization and the installation of the construction facilities for the site of the lock #9, according to the specifications.
 - .3 A third portion up to a maximum of 5 % of the total amount bid for this item and not more than 2% of the total amount bid for items 2 to 4 of the *Bid Form* will be paid when the Contractor has completely removed, characterized and transported to the landfill sludge, zebra mussels and other waste present at the bottom of the lock.
 - .4 A fourth portion up to a maximum of 55 % of the total amount bid for this item and not more than 22% of the total amount bid for items 2 to 4 of the *Bid Form* will be paid to a percentage consistent with the general progress of work of items 2 to 4.
 - .5 The balance of the lump sum bid for this position will be paid when all of the work in this contract is fully completed to the satisfaction of the PCA representative, and the site restoration and general site demobilization are fully completed.
- .2 Item 1.2 – Service Visits
- .1 Payment item 1.2 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the demonstration by the Contractor to the attention of the PCA representatives that the new equipment (structure, mechanics, automation and electricity) of the lock are working properly. A service visit must be conducted prior to the re-flooding of the lock and another service visit must be made at least 7 days after the resetting of the lock. For bid submission, the Contractor must consider that each service visit will have a duration of four (4) consecutive hours.
- .3 Item 1.3 – Works at upstream reach

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- .1 Item 1.3.1 – 1.5 meters high upstream cofferdam
 - .1 Payment item 1.3.1 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in a cofferdam of 1.5 meters high to be installed above 5 meters upstream of the upstream doors of the lock #9, whereas the APC stoplogs are installed (by the MTQ) as a cofferdam in Chambly Canal above Gouin Bridge, as directed by the Agency Representative.
 - .2 The price includes, but is not limited to, the following:
 - .1 On-site surveys;
 - .2 Validation of the dimensions indicated in the drawings;
 - .3 Cleaning existing grooves and threshold;
 - .4 The design for supply, installation and removal of the cofferdam;
 - .5 Installation of the cofferdam and the certificate of conformity of the cofferdam installed;
 - .6 Removal of the cofferdam.
 - .3 The submitted price is paid as shown below:
 - .1 A first portion up to a maximum of 75 % of the total amount bid for this item will be paid for the installation of the cofferdam and the provision of the certificate of conformity of the cofferdam installation.
 - .2 The balance of the lump sum bid for this position will be paid after the removal of the cofferdam.
 - .4 Depending on the needs, the amount of this item may be used in whole or not used. The Contractor will not be entitled to any financial compensation in the latter case.
- .2 Item 1.3.2 – Pumping of 10 m³/hr
 - .1 Payment item 1.3.2 of the *Bid Form* is per day for all costs incurred for pumping water from the reach to the Richelieu River, as directed by the Agency Representative for this purpose.
 - .2 The price includes, but is not limited to, the following:
 - .1 The supply of equipment and energy for a pumping capacity of at least 10 m³ / hr;
 - .2 Maintenance and protection of equipment.
 - .3 One day of pumping will be granted to the Contractor for each pumping day up to 24 hours of operation.
 - .4 Depending on the requirements, the work under this item may be used in whole or in part or not used at all. The Contractor will not be entitled to any financial compensation in these latter cases.
- .3 Item 1.3.3 – Pumping of 100 m³/hr

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- .1 Payment item 1.3.3 of the *Bid Form* is per day for all costs incurred for pumping water from the reach to the Richelieu River, as directed by the Agency Representative for this purpose.
 - .2 The price includes, but is not limited to, the following:
 - .1 The supply of equipment and energy for a pumping capacity of at least 100 m³ / hr;
 - .2 The supply, installation and maintenance of an automatic start and stop system for buoy type pumps or provide a supervisor for the management of full-time pumps;
 - .3 Maintenance and protection of equipment.
 - .3 One day of pumping will be granted to the Contractor for each mobilization requested by the Agency Representative.
 - .4 One day of pumping will be granted to the Contractor for each demobilization requested by the Agency Representative.
 - .5 One day of pumping will be granted to the Contractor for each pumping day up to 24 hours of operation.
 - .6 Depending on the requirements, the work under this item may be used in whole or in part or not used at all. The Contractor will not be entitled to any financial compensation in these latter cases.
- .4 Item 1.3.4 – Pumping of 300 m³/hr
- .1 Payment item 1.3.4 of the *Bid Form* is per day for all costs incurred for pumping water from the reach to the Richelieu River, as directed by the Agency Representative for this purpose.
 - .2 The price includes, but is not limited to, the following:
 - .1 The supply of equipment and energy for a pumping capacity of at least 300 m³ / hr;
 - .2 Maintenance and protection of equipment.
 - .3 One day of pumping will be granted to the Contractor for each mobilization requested by the Agency Representative.
 - .4 One day of pumping will be granted to the Contractor for each demobilization requested by the Agency Representative.
 - .5 One day of pumping will be granted to the Contractor for each pumping day up to 24 hours of operation.
 - .6 Depending on the requirements, the work under this item may be used in whole or in part or not used at all. The Contractor will not be entitled to any financial compensation in these latter cases.
- .4 Item 1.4 – Works at upstream reach
- .1 Item 1.4.1 – Downstream cofferdam
 - .1 Payment item 1.4.1 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in lowering the

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water level in the area downstream of Lock # 9 to allow for the completion of the required work.

- .2 The price includes, but is not limited to, the following:
 - .1 On-site surveys;
 - .2 Validation of the dimensions indicated in the drawings;
 - .3 Cleaning existing grooves and threshold;
 - .4 The design for supply, installation and removal of the cofferdam;
 - .5 Installation of the cofferdam and the certificate of conformity of the cofferdam installed;
 - .6 Removal of the cofferdam.
 - .3 The submitted price is paid as shown below:
 - .1 A first portion up to a maximum of 75 % of the total amount bid for this item will be paid for the installation of the cofferdam and the provision of the certificate of conformity of the cofferdam installation.
 - .2 The balance of the lump sum bid for this position will be paid after the removal of the cofferdam.
 - .4 Depending on the needs, the amount of this item may be used in whole or not used. The Contractor will not be entitled to any financial compensation in the latter case.
- .2 Item 2 – Structure
 - .1 Item 2.1 – Replacement of doors
 - .1 Item 2.1.1 – Replacement of upstream and downstream doors
 - .1 Payment item 2.1.1 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the replacement of the two doors and the strengthening of the upstream threshold, according to the drawings, specifications and instructions of the Agency Representative.
 - .2 The price includes, but is not limited to, the following:
 - .1 On-site surveys;
 - .2 Validation of the dimensions indicated in the drawings;
 - .1 In particular, the Contractor must verify that the dimensions of the molds for lower pivots and upper pivots provided by the PCA allow the manufacture of the new door pivots according to the drawings of this contract. If the molds are not returned or are returned in poor condition to the PCA, the Contractor must provide new molds at his own expense.
 - .3 Removal and storage of existing doors;

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- .4 The supply of new doors including new shoes, pivots, 'U' collars, guillotine valves, rack fasteners, walkways and guardrails;
- .5 The demolition and reconstruction of the doorways;
- .6 Installation of new doors;
- .7 Reinforcement of thresholds;
- .8 The necessary adjustments to make the doors waterproof and functional;
- .9 Removal, storage and reinstallation of signage on new doors;
- .10 The recovery and delivery to the PCA of certain existing equipment as mentioned in the drawings;
- .11 The supply and installation of steel ballast plates to ensure that each new door installed (including the footbridge and guillotine gate opening mechanism) has a mass of at least 7000 kg;
 - .1 When installing the doors in the lock, the Contractor must provide the mass of door components to assess the need for weight plates.
- .12 Off-site disposal of old doors after complete installation of new doors.
- .3 The lump sum bid for this position is payable when all of the work in this position is fully completed to the satisfaction of the Agency Representative.
- .2 Item 2.1.2 – Mold for lower pivot
 - .1 Payment item 2.1.2 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the supply of a new mold for the manufacture of lower pivots, according to the drawings of this contract of the Agency Representative's instructions.
 - .2 Depending on the needs, the amount of this item may be used in whole or not used. The Contractor will not be entitled to any financial compensation in the latter case.
- .3 Item 2.1.3 – Mold for upper pivot
 - .1 Payment item 2.1.2 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the supply of a new mold for the manufacture of upper pivots, according to the drawings of this contract of the Agency Representative's instructions.
 - .2 Depending on the needs, the amount of this item may be used in whole or not used. The Contractor will not be entitled to any financial compensation in the latter case.
- .2 Item 2.2 – Repointing

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- .1 Item 2.2.1 – Repointing Stone/Stone
 - .1 Payment item 2.2.1 of the *Bid Form* is priced per linear metre (Lin. m.) for masonry repointing, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Removing of deteriorated joints;
 - .2 Cleaning and rinsing of removed joints;
 - .3 Removal of any accumulation of water;
 - .4 The supply, filling and shaping of the joints with the product and cure indicated in the contract.
- .2 Item 2.2.2 – Repointing Stone/Wood
 - .1 Payment item 2.2.2 of the *Bid Form* is priced per linear metre (Lin. m.) for masonry repointing, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Removing of deteriorated joints;
 - .2 Cleaning and rinsing of removed joints;
 - .3 Removal of any accumulation of water;
 - .4 The supply, filling and shaping of the joints with the product and cure indicated in the contract.
- .3 Item 2.2.3 – Repointing Concrete/Concrete
 - .1 Payment item 2.2.3 of the *Bid Form* is priced per linear metre (Lin. m.) for masonry repointing, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Removing of deteriorated joints;
 - .2 Cleaning and rinsing of removed joints;
 - .3 Removal of any accumulation of water;
 - .4 The supply, filling and shaping of the joints with the product and cure indicated in the contract.
- .3 Item 2.3 – Vertical joints and folded plates
 - .1 Item 2.3.1 – Vertical joints sealing
 - .1 Payment item 2.3.1 of the *Bid Form* is priced per linear metre (Lin. m.) for joints sealing, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Cleaning and surface preparation;
 - .2 The supply, filling and shaping of the joints with the product and cure indicated in the contract.
 - .2 Item 2.3.2 – Replacement of folded plates

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- .1 Payment item 2.3.2 of the *Bid Form* is priced per linear metre (Lin. m.) for folded plates, according to the drawings, specifications and Agency Representative's instructions.
- .2 The price includes, but is not limited to, the following:
 - .1 Removing of existing plates;
 - .2 Supply and installation of new steel plates.
- .4 Item 2.4 – Cavity injection
 - .1 Item 2.4.1 – Prefabricated blocks
 - .1 Payment item 2.4.1 of the *Bid Form* is priced per linear metre (Lin. m.) for prefabricated blocks, according to the drawings, specifications and Agency Representative's instructions.
 - .2 Drying of the required work zone must be included in the item 1.4.
 - .3 The price includes, but is not limited to, the following:
 - .1 Supply of prefabricated blocks;
 - .2 Excavation and leveling the bottom of the Chambly Canal;
 - .3 Rinsing the cavity to be injected;
 - .4 Supply and installation of injection pipes;
 - .5 The installation of prefabricated blocks and temporary elements in order to obtain a hermetic formwork;
 - .6 Repositioning excavation materials on prefabricated blocks;
 - .7 The removal of excess injection pipes from above the injection concrete once the injection concrete has reached 1 MPa.
 - .2 Item 2.4.2 – Injection concrete
 - .1 Payment item 2.4.2 of the *Bid Form* is priced per cubic metre (m³) for concrete, according to the drawings, specifications and Agency Representative's instructions.
- .5 Item 2.5 – Painting
 - .1 Item 2.5.1 – Armoring plates
 - .1 Payment item 2.5.1 of the *Bid Form* is priced per square metre (m²) for steel plate whose exposed face has been protected against corrosion, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Supply of paint system;
 - .2 Cleaning, surface preparation and painting of the armoring plates;
 - .3 Control shelter.

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- .2 Item 2.5.2 – 100x100 plates
 - .1 Payment item 2.5.2 of the *Bid Form* is unit priced for 100x100 steel plates whose exposed face has been protected against corrosion, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Supply of paint system;
 - .2 Cleaning, surface preparation and painting of the 100x100 steel plates;
- .6 Item 2.6 – Right wall - Upstream
 - .1 Item 2.6.1 – Wooden tie to be repair
 - .1 Payment item 2.6.1 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the repair of three (3) existing ties on the upstream right wall, according to the drawings of this contract of the Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 The preparation, presentation and correction of the shop drawings and of the Work Plan concerning wooden caps;
 - .2 Removal of the degraded part of the wooden tie;
 - .3 Application of the approved wood preservative;
 - .4 Supply and installation of the wooden caps.
 - .2 Item 2.6.2 – Scouring
 - .1 Payment item 2.6.2 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the correction of an existing scour at the upstream right wall, according to the drawings of this contract of the Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Removal and storage of paving stones;
 - .2 Excavation work to clear a 1.2 m x 1.2 m horizontal surface at the bottom of the excavation to a depth of 1.5 m;
 - .3 Supply and installation of geotextile;
 - .4 Backfilling with excavation materials;
 - .5 The supply and implementation of new MG-20. For bidding purposes, the Contractor must provide a volume of approximately 2 cubic meters;
 - .6 Reinstatement of the removed pavers.
 - .3 Item 2.6.3 – Wooden anchor base

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- .1 Payment item 2.6.3 of the *Bid Form* is priced per linear metre (Lin. m.) for wooden beam, according to the drawings, specifications and Agency Representative's instructions.
- .2 The price includes, but is not limited to, the following:
 - .1 Removal of guardrail;
 - .2 Excavation work;
 - .3 Removal of the wood pieces to be replaced;
 - .4 Recovery of all assembly elements;
 - .5 Supply and installation of new pieces of wood;
 - .6 Supply and painting with CCA on cuts made on wood (existing and new);
 - .7 Backfilling with excavation materials;
 - .8 Repositioning the guardrail.
- .7 Item 2.7 – Ramps to be modified
 - .1 Item 2.7.1 – Concrete landing (150 mm thick)
 - .1 Payment item 2.7.1 of the *Bid Form* is priced per square metre (m²) for new concrete landing, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The surface is calculated according to the horizontal projection of new concrete landing.
 - .3 The price includes, but is not limited to, the following:
 - .1 Supply and installation of materials, including concrete, anchors and reinforcement, texturing of pedestrian surfaces, concrete cure, removal of the formworks, surface finishing and control joints.
 - .2 Item 2.7.2 – Concrete ramp
 - .1 Payment item 2.7.2 of the *Bid Form* is priced per square metre (m²) for new concrete ramp, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The surface is calculated according to the horizontal projection of new concrete ramp.
 - .3 The price includes, but is not limited to, the following:
 - .1 Removal and storage of paving stones;
 - .2 Excavation and disposal of excavation materials;
 - .3 Preparation and installation of the granular base;
 - .4 Supply and installation of materials, including concrete, anchors and reinforcement, texturing of pedestrian surfaces, concrete cure, removal of the formworks, surface finishing and control joints.
 - .5 Cut and reinstatement of the removed pavers;

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- .6 Transportation and delivery to the PCA of residual pavers once the new ramps are completed. The Contractor must provide that the PCA storage site is within 25 km.
- .3 Item 2.7.3 – Guardrail modifications
 - .1 Payment item 2.7.3 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the guardrails located on the lock doors or on the footbridge, according to the drawings of this contract of the Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Removal of railing sections identified on the plans;
 - .2 Modifications on the guardrail;
 - .3 Supply, preparation and installation of steel corrosion protection products;
 - .4 Supply, preparation and installation of anchorages for guardrail bases;
 - .5 Installation of removed sections of guardrail.
- .8 Item 2.8 – Checkered plates to bolt
 - .1 Item 2.8.1 – Type 1 bolts
 - .1 Payment item 2.8.1 of the *Bid Form* is unit priced for the supply and the installation of bolts, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Handling of existing plates;
 - .2 Drilling, milling, installing nuts, welding, painting and bolting existing plates;
 - .3 Supply and installation of non-slip product.
 - .2 Item 2.8.2 – Type 2 bolts
 - .1 Payment item 2.8.2 of the *Bid Form* is unit priced for the supply and the installation of bolts, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Handling of existing plates;
 - .2 Drilling, milling, installing nuts, welding, painting and bolting existing plates;
 - .3 Supply and installation of anti-seize lubricant.
- .9 Item 2.9 – Draining plates
 - .1 Payment item 2.9 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the supply and installation of a drainage plate on the left wall downstream of the downstream doors and the supply and replacement of a drainage plate on the right wall

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- downstream of the downstream doors, according to the drawings of this contract of the Agency Representative's instructions.
- .10 Item 2.10 – Wooden protection
- .1 Payment item 2.10 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the supply and replacement of a wooden defense segment of the right wall ladder upstream of the downstream doors, according to the drawings of this contract of the Agency Representative's instructions.
- .2 The price includes, but is not limited to, the following:
- .1 The supply and painting with CCA of the cuts made on the wood;
- .2 The supply and installation of the new anchors of the replaced defense segment.
- .11 Item 2.11 – Concrete repair without extra thickness
- .1 Payment item 2.11 of the *Bid Form* is priced per square metre (m²) for new concrete in contact with formwork, according to the drawings, specifications and Agency Representative's instructions.
- .2 The price includes, but is not limited to, the following:
- .1 Saw cuts;
- .2 Concrete demolition;
- .3 Supply and installation of materials including formwork, rebar, anchors and concrete;
- .4 Cure, formwork removal and concrete finishing.
- .12 Item 2.12 – Anchors for protection plates
- .1 Payment item 2.12 of the *Bid Form* is priced per linear metre (Lin. m.) of protection plates (on the walls and at the bottom of the lock) removed and replaced, according to the drawings, specifications and Agency Representative's instructions.
- .2 The price includes, but is not limited to, the following:
- .1 Sawing the anchors indicated by the Agency Representative (the anchors are corroded to the point that nuts can not be detached from their respective rods);
- .2 Removal and handling of the protection plates;
- .3 Drilling, supply and installation of new anchorages. For submission, the Contractor must consider that all existing anchorages will be replaced by new ones;
- .4 Repositioning and bolting the protection plates.
- .13 Item 2.13 – Land survey of lock
- .1 Payment item 2.13 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the land survey of lock, according to the drawings of this contract of the Agency Representative's instructions.

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- .2 The price includes, but is not limited to, the following:
 - .1 Land survey and supply of survey documents in formats « .xls », « .dwg » et « .pdf ».
- .14 Item 2.14 – Reconstruction of trenches
 - .1 Item 2.14.1 – New arrangements
 - .1 Payment item 2.14.1 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the replacement of existing trenches to accommodate new manual door opening mechanisms that are not specifically part of other payment items in the *Bid Form*.
 - .2 The price includes, but is not limited to, the following:
 - .1 Positioning and implantation of new trenches;
 - .2 Removal of crowning stones at doors #2 and #3, delivery of these stones to PCA and transportation of these stones to a storage site within 25 km;
 - .3 The removal and disposal of the steel covers of the trenches to be replaced;
 - .4 The removal, modification, reinstallation and painting of guardrails and anchorages;
 - .5 Removal and storage of paving stones;
 - .6 Excavation work and the realization of 4 exploratory wells with a depth of 1.2 meters aligned with the 4 caissons provided under the new trenches of the door opening racks;
 - .1 The Contractor shall allow 5 business days after the completion of the 4 exploration wells to allow the Agency Representative to evaluate whether it is required to install caisson piles or to prepare an alternative to the caisson piles shown on the drawings.
 - .7 The disposition of remaining excavation materials;
 - .8 Supply and backfilling using granular materials from excavations;
 - .9 Cut and reinstatement of the removed pavers;
 - .10 Supply and installation of wooden covers for the new trenches as well as chains and chain anchors for wooden covers;
 - .11 The supply and installation of 2 new 850 mm x 850 mm x 6 mm black painted galvanized steel checker plates to replace the 2 existing control cabinets;
 - .12 Transport and reinstallation of crowning stones from a PCA storage site within 25 km;
 - .2 Item 2.14.2 – Box-section piles

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- .1 Payment item 2.14.2 of the *Bid Form* is priced per linear metre (Lin. m.) for supply and installation of box-section piles, according to the drawings, specifications and Agency Representative's instructions.
 - .2 For each of the caisson piles, the length to be recorded for this item includes the rock embedment. The length to be recorded is calculated from the top of the box pile to the bottom of the rock embedment according to the drawings, specifications and instructions of the Agency Representative.
 - .3 The price includes, but is not limited to, the following:
 - .1 Supply and installation of tubular sections including drilling and cleaning of the rock embedment and the leveling of the tubular sections;
 - .2 Supply and installation of reinforcing steel;
 - .3 Supply, installation and cure of the concrete.
 - .4 Depending on the requirements, the work under this item may be used in whole or in part or not used at all. The Contractor will not be entitled to any financial compensation in these latter cases.
- .3 Item 2.14.3 – Concrete demolition
- .1 Payment item 2.14.4 of the *Bid Form* is priced per cubic metre (m³) for demolished concrete, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The volumes to be recorded for this item are calculated based on the actual volumes of demolished concrete (the void volume inside trenches is excluded).
 - .3 The price includes, but is not limited to, the following:
 - .1 Saw cuts;
 - .2 The removal and disposal of concrete and steel parts from the demolition.
- .4 Item 2.14.4 – Concrete
- .1 Payment item 2.14.4 of the *Bid Form* is priced per cubic metre (m³) for concrete, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Surface preparation;
 - .2 The supply and installation of drainage tubes at the bottom of the new trenches of racks;
 - .3 Supply, placement, texturing of pedestrian surfaces, curing of new concrete and finishing of surfaces.
- .5 Item 2.14.5 – Reinforcing

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- .1 Payment item 2.14.5 of the *Bid Form* is a price per kilogram (kg) of steel, based on the quantities placed in the formwork, in accordance with the requirements of the drawings, specifications and Agency Representative's instructions.
- .2 The price includes, but is not limited to, the following:
 - .1 The supply and installation of reinforcing steel as well as the reinforcement support elements for concrete casting.
- .6 Item 2.14.6 – Forming
 - .1 Payment item 2.14.6 of the *Bid Form* is priced per square metre (m²) of surface coming into contact with the concrete to be poured, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 The supply, installation and removal of formwork including fasteners, shoring and other supports to allow concrete work.
- .7 Item 2.14.7 – Coping stone
 - .1 Payment item 2.14.7 of the *Bid Form* is priced per square metre (m²) of new coping stones. The area to be accounted for this item is calculated according to the horizontal projection of the new coping stones installed, according to the drawings, specifications and Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 Supply, cutting and installation of new coping stones;
 - .2 The supply, and the installation of the grout support and the repointing grout of the new coping stones.
- .3 Item 3 – Mechanical
 - .1 Item 3.1 – Door opening mechanism (4 required)
 - .1 Payment item 3.1 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the replacement of the 4 door mechanisms, the installation of the racks and the installation of the rack fasteners on the doors, according to the drawings of this contract of the Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 On-site surveys;
 - .2 Validation of the dimensions indicated in the drawings;
 - .1 In particular, the Contractor must verify that the dimensions of the molds for lower pivots and upper pivots provided by the PCA allow the manufacture of the new door pivots according to the drawings of this contract. If the molds are not returned or are returned in

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- poor condition to the PCA, the Contractor must provide new molds at his own expense.
- .3 Removal and storage of existing door mechanisms;
 - .4 The supply of new door mechanisms including the new preassembled Cabestans, racks and rack fasteners;
 - .5 Installation of new door mechanisms;
 - .6 The necessary adjustments to make the opening of the doors functional;
 - .7 The recovery and delivery to the PCA of certain existing equipment as mentioned in the drawings.
- .3 The lump sum bid for this item is payable when all the work in this item is fully completed to the satisfaction of the Agency Representative.
- .2 Item 3.2 – Sluice Gate Opening Mechanism (4 required)
- .1 Payment item 3.2 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the replacement of the 4 valve mechanisms, including the fixing of the wood studs on the doors on site (the mechanisms will already be pre-assembled on the wood studs), according to the drawings of this contract of the Agency Representative's instructions.
 - .2 The price includes, but is not limited to, the following:
 - .1 On-site surveys;
 - .2 Validation of the dimensions indicated in the drawings;
 - .1 In particular, the Contractor must verify that the dimensions of the molds for lower pivots and upper pivots provided by the PCA allow the manufacture of the new door pivots according to the drawings of this contract. If the molds are not returned or are returned in poor condition to the PCA, the Contractor must provide new molds at his own expense.
 - .3 Removal and storage of existing sluices gate opening mechanisms;
 - .4 The supply of new sluices gate opening mechanisms;
 - .5 Installation of new sluices gate opening mechanisms;
 - .6 The necessary adjustments to make the opening of the sluices gate opening functional;
 - .7 The recovery and delivery to the PCA of certain existing equipment as mentioned in the drawings.
 - .3 The lump sum bid for this item is payable when all the work in this item is fully completed to the satisfaction of the Agency Representative.
- .3 Item 3.3 – Hydraulic System Dismantling
- .1 Payment item 3.3 of the *Bid Form* is a fixed lump sum amount to compensate all necessary expenses incurred in the dismantling of the

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- hydraulic system, including all components: tank, motors, pumps, valves, cylinders, hydraulic lines (including those passing under the lock), electrical connection, control panel, support, etc.
- .2 The price includes, but is not limited to, the following:
 - .1 On-site surveys;
 - .2 Removal and storage of existing hydraulic system, according to the instructions of the Agency Representative;
 - .3 The recovery and delivery to the PCA of certain existing equipment.
 - .3 The lump sum bid for this item is payable when all the work in this item is fully completed to the satisfaction of the Agency Representative.
- .4 Item 4 – Electrical
- .1 Item 4.1 - Demolition.
 - .1 Item 4.1 of the Price Line, *Demolition* is payable on a lump sum amount according to the instructions provided to the drawings, specifications, and guidelines of the Agency Representative.
 - .2 The bid price for this position must include the following, but not limited to:
 - 1. The removal of equipment and electrical power systems, including ducts, conductors, and accessories, from the load to the power source;
 - 1. The "Off" positioning of the protective devices and the word "Free" for these circuits;
 - 1. The handing, loading, and unloading of the electrical distribution panel, the hydraulic system control panel for opening and closing the lock doors, the various components, and the transfer switch to the Parks Canada's Chambly workshops;
 - 1. Any incidental expenses for the work as described in the drawings and specifications.
 - .2 Item 4.2 - Electrical Work and Miscellaneous Work.
 - 1. Item 4.2 of the Price Line, *Electrical Works and Miscellaneous Works* is payable on a lump sum amount according to the instructions provided to the drawings, specifications, and guidelines of the Agency Representative.
 - .1 The bid price for this item must include the following, but not limited to:
 - .1 The supply and installation of circuit breakers, ducts, conductors, hardware, and accessories for connecting loads;
 - 1. Elimination of excess cable inside transformer cabinet;
 - .2 Updating circuit identifications in the panel schedule and identifying loads on the drawing;
 - .3 Reinstalling the wiring of the door contact;

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- .4 Replacing an existing plywood section with a fire-retardant plywood section;
 - .5 Replacing protective devices, such as breakers;
 - 1. Any incidental expenses for the work as described in the drawings and specifications.
- .3 Item 4.3 - Emergency Lighting.
- .1 Item 4.3 of the Bid Form, *Emergency Lighting* is payable on a lump sum amount according to the instructions provided to the drawings, specifications, and guidelines of the Agency Representative.
 - .2 The bid price for this item must include the following, but not limited to:
 - .1 The supply and installation of an emergency battery, satellite headlights, a console for the installation of the battery, an exit sign, ducts, wiring, circuit breakers for powering equipment, hardware, accessories, and any incidental expenses for the completion of a complete and functional installation.
- .4 Item 4.4 - Miscellaneous Work in the Lockmaster Lodge.
- .1 Item 4.4 of the Bid Form, *Miscellaneous Works in the Lockmaster Lodge* is payable on a lump sum amount according to the instructions provided to the drawings, specifications, and guidelines of the Agency Representative.
 - .2 The bid price for this item must include the following, but not limited to:
 - .1 The supply and installation of a shutter plate;
 - .2 Replacing the fire alarm circuit breaker, including the supply and installation of a locking device;
 - .3 Updating circuit identifications in panel schedules and replacing schedules;
 - .4 Identifying charges on a drawing;
 - .5 Any incidental expenses for the work as described in the drawings and specifications.
- .5 Item 4.5 - Modifications to Upstream and Downstream Operator Consoles.
- .1 Item 4.5 of the Bid Form, *Modifications to Upstream and Downstream Operator Consoles* is payable on a lump sum amount according to the guidance provided to the drawings, specifications, and guidelines of the Agency Representative.
 - .2 The bid price for this item must include the following, but not limited to:
 - .1 The provision and installation of control, including all components;
 - .2 The modification of existing wiring;
 - .3 The removal of existing devices, handling, transport, and unloading of components at the Chambly workshops, at the location designated by the Agency Representative;
 - .4 The identification of wiring at all ends of the cables;

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- .5 Any incidental expenses for the work as described in the drawings and specifications.

Part 3 Products

3.1 NOT USED

.1 Not Used.

Part 4 Execution

4.1 NOT USED

.1 Not Used.

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PROJECT MEETINGS

Part 1 General

1.1 ADMINISTRATIVE

- .1 The Contractor shall provide for the holding of project meetings with the Representative of Parks Canada Agency (PCA) throughout the course of the work, every two (2) weeks.
- .2 The Agency Representative prepares agenda for meetings.
- .3 The Agency Representative distribute a written notice of each meeting four (4) days in advance of the meeting date to the Contractor, the Parks Canada Agency (PCA) project manager.
- .4 Provide physical space and plan for meetings.
- .5 The Agency Representative presides at meetings.
- .6 The Agency Representative records the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within three (3) days after meetings and transmit to meeting participants and affected parties not in attendance.
- .8 Representative of Contractor attending meetings will be qualified and authorized to act on behalf of party each represents.
- .9 The meeting costs shall be included in the contract price corresponding to the Schedule of Prices.

1.2 PRECONSTRUCTION MEETING

- .1 Within 15 days the receipt of the award letter, request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities.
- .2 The PCA project manager, the Agency Representative, the Design Engineer, as well as the Contractor and the main Subcontractors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - *Construction Facilities*.
 - .5 Site security in accordance with Section 01 56 00 - *Temporary Barriers and Enclosures*.

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PROJECT MEETINGS

- .6 Proposed changes, change orders, procedures, approvals required, overtime, administrative requirements.
- .7 Record drawings in accordance with Section 01 33 00 - *Submittal Procedures*.
- .8 Take-over procedures, acceptance, and warranties in accordance with Section 01 33 00 - *Submittal Procedures*.
- .9 Monthly progress claims, administrative procedures, photographs, hold backs.
- .10 Appointment of inspection and testing agencies or firms.
- .11 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 The Agency Representative shall establish a project meeting schedule, taking place every two (2) weeks over the course of the work until completion.
- .2 Shall be present at this meeting: Contractor and main Subcontractors, PCA project manager, and Agency Representative.
- .3 The Agency Representative shall determine the time and location of the meeting and notify the parties concerned at least four (4) days prior.
- .4 The Agency Representative prepares the meeting minutes and distributes them to the participants as well as other concerned parties within three (3) business days.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Health and safety.
 - .3 Review of Work progress since previous meeting.
 - .4 Field observations, problems, conflicts.
 - .5 Problems which impede construction schedule.
 - .6 Review of off-site fabrication delivery schedules.
 - .7 Corrective measures and procedures to regain projected schedule.
 - .8 Revision to construction schedule.
 - .9 Progress schedule, during succeeding work period.
 - .10 Review submittal schedules: expedite as required.
 - .11 Maintenance of quality standards.
 - .12 Review proposed changes for effect on construction schedule and on completion date.
 - .13 Other business.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

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PROJECT MEETINGS

Part 3	Execution
3.1	NOT USED
.1	Not Used.

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
- .2 Bar Chart (GANTT Chart) : graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
- .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
- .4 Construction Work Week: Monday to Friday, inclusive, will provide five-day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
- .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
- .6 Master Plan: summary-level schedule that identifies major activities and key milestones.

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- .7 Milestone: significant event in project, usually completion of major deliverable.
- .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that shall be accomplished to satisfy Project objectives. Monitoring and control process involve using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
- .9 Project Planning, Monitoring and Control System: overall system operated by the Consultant to enable monitoring of project work in relation to established milestones.

1.3 REQUIREMENTS

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

1.4 ACTION AND INFORMATIONAL SUBMITTALS

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

1.5 PROJECT MILESTONES

- .1 The project milestones are the intermediate objectives set out in the implementation schedule, based on the work specified.

1.6 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 The Agency Representative will review and return revised schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 5 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

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1.7 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 The detailed implementation schedule shall include at the least, the steps for the following activities:
 - .1 Award of contract;
 - .2 Land and access roads;
 - .3 Preparation and processing of Contractor's documents;
 - .4 Repair of stop logs;
 - .5 Temporary signaling;
 - .6 Drying of the lock;
 - .7 Contractual repairs as detailed in the Drawings.
 - .8 Removal of stop logs;
 - .9 Demobilization;
 - .10 Restitution of existing land;
 - .11 Final demobilization

1.8 PROJECT SCHEDULE REPORTING

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

1.9 PROJECT MEETINGS

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

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

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SUBMITTAL PROCEDURES

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 ADMINISTRATIVE

- ~~.1~~ ~~A maximum of two (2) weeks after the award of the Contract by Parks Canada, the Contractor must provide a list of subcontractors.~~
- ~~2.1~~ Promptly and according to a predetermined sequence such that the execution of works is not delayed, submit the required documents and samples to the Agency Representative for inspection. A delay in this respect is not a sufficient reason to obtain an extension to the completion schedule of the Works and therefore no such request will be accepted.
- ~~3.2~~ Do not undertake work for which the submittal of documents and samples are required until the inspection of all documents submitted has been finished.
- ~~4.3~~ Present shop drawings, product data, samples, and mock-ups in SI Metric units.
- ~~5.4~~ Where items or information is not produced in SI Metric units converted values are acceptable.
- ~~6.5~~ Review submittals prior to submission to the Agency 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.

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SUBMITTAL PROCEDURES

- ~~7.6~~ Notify the Agency Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- ~~8.7~~ Contractor's responsibility for submitting complete and exact documents is not relieved by the Agency Representative's review of submittals.
- ~~9.8~~ Contractor's responsibility for errors and omissions in submission is not relieved by the Agency Representative's review of submittals.
- ~~10.9~~ Keep one reviewed copy of each submission on site as well as the list of documents submitted by the Contractor.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 The shop drawings must bear the seal and signature of a qualified and authorized engineer, member in good standing of the *Ordre des ingénieurs du Québec*.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow five (5) days for the Agency Representative to review each submission.
- .5 Adjustments made on shop drawings by the Agency Representative are not intended to change the Schedule of Prices. If adjustments affect value of Work, state such in writing to the Agency Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as the Consultant may require, consistent with Contract Documents. When resubmitting, notify the Agency Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.

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SUBMITTAL PROCEDURES

- .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's details.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After the Agency Representative's review, the Contractor shall distribute copies of shop drawings and technical specifications.
- .10 Submit two (2) printed copies and one (1) electronic copy of all shop drawings prescribed in the specification sections and according to the requirements of the Agency Representative.
- .11 If a shop drawing is not required due to the use of a standard manufacturing product, submit two (2) printed copies and one (1) electronic copy of the technical data sheet or the manufacturer's documentation prescribed in the specification sections and as required by the Agency Representative.
- .12 Submit two (2) printed copies and one (1) electronic copy of the test reports prescribed in the specification sections and as required by the Agency Representative.
 - .1 The report signed by the official representative of the testing laboratory must certify that materials, products, and systems identical to those proposed in the Work have been tested in accordance with prescribed requirements.
 - .2 The tests must have been carried out within five (5) years preceding the date of contract award.
- .13 Submit two (2) printed copies and one (1) electronic copy of the certificates prescribed in the specification sections and as required by the Agency Representative.
 - .1 Documents must be printed on official correspondence paper of the manufacturer, signed by a representative of the latter, and must certify that the products, materials, equipment, and systems provided meet the requirements of the specifications.

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SUBMITTAL PROCEDURES

- .2 Certificates must bear a date after the award of the Contract and indicate the name of the project.
- .14 Submit two (2) printed copies and one (1) electronic copy of the manufacturer's instructions as prescribed in the specification sections and as required by the Agency Representative.
 - .1 Documents must be pre-printed, describing the method of installation of the products, equipment, materials, and systems, including special notices and material safety data sheets indicating any impedances and hazards, as well as safety measures to be implemented.
- .15 Submit two (2) printed copies and one (1) electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by the Agency Representative.
- .16 Submit two (2) printed copies and one (1) electronic copy of all documentation with regards to the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit two (2) printed copies and one (1) electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by the Agency Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by the Agency Representative, no errors or omissions are discovered or if only minor corrections are made, one (1) printed copy will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by Parks Canada Agency (PCA) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that PCA approves detailed design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.4 SAMPLES

- .1 Submit for review samples in triplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to the Agency Representative's site office.

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SUBMITTAL PROCEDURES

- .3 Notify the Agency Representative in writing, at time of submission, of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to prior to proceeding with Work.
- .6 Make changes in samples which may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.5 MOCK-UPS

- .1 Erect mock-ups in accordance with 01 45 00 - *Quality Control*.

1.6 PHOTOGRAPHIC DOCUMENTATION

- .1 Not used.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
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- .10 Section 05 50 00 *Metal Fabrications*
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- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 REFERENCE STANDARDS

- .1 Transportation and Dangerous Goods Act (1999)
- .2 Canadian Council of Ministers of the Environment (CCME) Documentation

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00- *Submittal Procedures*.
- .2 Submit, prior to start of work, the plan detailing management of hazardous wastes. Submit written documentation of weekly hazardous waste inspections.
- .3 Submittals for Progress Meetings: make submittals at least 24 hours before the meeting.
 - .1 Updated progress schedule detailing activities. Include review of progress with respect to previously established dates for starting and stopping various stages of Work, major problems and action taken, injury reports, equipment breakdown, and material removal.
 - .2 Copies of transport manifests, trip tickets, and disposal receipts for waste materials removed from work area.

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- .3 Weekly copies of site entry and work area logbooks with information on worker and visitor access.
- .4 Weekly logs documenting of engineering controls.
- .5 Other information required by the Agency Representative or relevant to agenda for upcoming progress meeting.
- .4 Site Layout: within 7 days after date of Notice to Proceed and prior to mobilization to site, submit site layout drawings showing existing conditions and facilities, construction facilities and temporary controls provided by Contractor including following:
 - .1 Equipment and personnel decontamination areas.
 - .2 Location of trees to protect.
 - .3 Location of the construction trailer for Contractor and for Agency Representative, and parking of employees' vehicles.
 - .4 Specifically indicate access to the bottom of the lock.
 - .5 Means of ingress, egress and temporary traffic control facilities. Refer to Section 01 56 00- *Temporary Barriers and Enclosures* for traffic control.
 - .6 Equipment and material staging areas.
 - .7 Demolition debris stockpile and soil stockpile areas.
 - .8 Exclusion Zones, Contaminant Reduction Zones, and other zones specified in Contractor's site-specific Health and Safety Plan.
 - .9 Grading, including contours, required to construct temporary facilities.
 - .10 Wastewater storage areas.
- .5 Equipment Decontamination Pad: submit equipment decontamination pad design to Agency Representative for review prior to commencing construction.
- .6 Submit documentation verifying that hazardous materials employees have been trained, tested, and certified to safely and effectively carry out their assigned duties.

1.4 REGULATORY REQUIREMENTS

- .1 Provide erosion and sediment control in accordance with Section 01 35 43 – *Environmental Procedures*.
- .2 Comply with federal, provincial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.
- .3 Work to meet or exceed minimum requirements established by federal, provincial, and local laws and regulations which are applicable.
 - .1 Contractor: responsible for complying with amendments as they become effective.
- .4 In event that compliance exceeds scope of work or conflicts with specific requirements of contract notify the Consultant immediately.

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1.5 SEQUENCING AND SCHEDULING

- .1 Do not commence Work involving contact with potentially contaminated materials until decontamination facilities are operational and approved by the Agency Representative.

1.6 EQUIPMENT DECONTAMINATION FACILITY

- .1 Prior to commencing work involving equipment contact with potentially contaminated materials, construct equipment decontamination pad.
- .2 Provide, operate, and maintain suitable portable, high-pressure, low-volume decontamination wash unit[s] equipped with self-contained water storage tank and pressurizing system and capable of heating and maintaining wash waters to 80 degrees C and providing nozzle pressure of 1,035 kPa.
- .3 Provide, operate, and maintain necessary equipment, pumps, and piping required to collect and contain equipment decontamination wastewater and sediment and transfer materials to approved storage facilities.

1.7 WASTEWATER STORAGE TANK

- .1 Provide, operate, and maintain wastewater storage tanks to store wastewaters.
- .2 Wastewater includes wastewater related to concrete pour, handbasin, shower, and laundry wastewaters from Personnel Hygiene/Decontamination Facility; water collected from dewatering operations; and water collected from Equipment Decontamination Facility.
- .3 Store wastewaters from dewatering operations and Equipment Decontamination Facility in separate tank from wastewater from Personnel Hygiene/Decontamination Facility.
- .4 If toilet facilities are provided in Personnel Hygiene/Decontamination Facility, store wastewater from these toilets with wastewater from handbasins, showers, laundry for ultimate disposal off site.
- .5 Discharges: comply with applicable discharge limitations and requirements; do not discharge wastewaters to site sewer systems that do not conform to or are in violation of such limitations or requirements; and obtain the Agency Representative's approval prior to discharge of wastewater.
- .6 Install wastewater storage tanks in locations as directed by the Agency Representative.
- .7 Connect pumps, piping, valves, miscellaneous items, and necessary utilities as required for operation of facilities; and protect tanks, valves, pumps, piping, and miscellaneous items from freezing.
- .8 Do not operate wastewater storage tanks until inspected and approved by the Agency Representative.
- .9 Notify the Agency Representative minimum 72 hours in advance of when wastewater storage tank is anticipated to be full.
 - .1 Do not discharge additional liquids to filled tank following sampling by the Agency Representative.

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- .2 The Agency Representative will determine appropriate disposition of wastewaters based on sample analysis.
- .10 Transport and dispose of wastewaters at off-site disposal facility as identified by Contractor and approved by the Agency Representative .

1.8 VEHICULAR ACCESS AND PARKING

- .1 Maintenance and Use:
 - .1 Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as determined by the Consultant; transport and place into designated area approved by the Agency Representative. Clean access roads at least once per shift.
 - .2 Agency Representative may collect soil samples for chemical analyses from traveling surfaces of constructed and existing access routes prior to, during, and upon completion of Work. Excavate and dispose of clean soil contaminated by Contractor's activities at no additional cost to the Consultant.

1.9 DUST AND PARTICULATE CONTROL

- .1 Execute Work by methods to minimize raising dust from construction operations.
- .2 Implement and maintain dust and particulate control measures as determined necessary by the Agency Representative during construction.
- .3 Provide positive means to prevent airborne dust from dispersing into atmosphere. Use potable water for water misting system for dust and particulate control.
- .4 Use chemical means for water misting system for dust and particulate control only with the Agency Representative's prior written approval.
- .5 As minimum, use appropriate covers on trucks hauling fine or dusty material. Use watertight vehicles to haul wet materials.
- .6 Prevent dust from spreading to adjacent property sites.
- .7 The Agency Representative will stop work at any time when Contractor's control of dusts and particulates is inadequate for wind conditions present at site, or when air quality monitoring indicates that release of fugitive dusts and particulates into atmosphere equals or exceeds specified levels.
- .8 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor shall discuss procedures that Contractor proposes to resolve problem. Make necessary changes to operations prior to resuming excavation, handling, processing, or other work that may cause release of dusts or particulates.

1.10 POLLUTION CONTROL

- .1 Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations.

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- .2 Be prepared to intercept, clean up, and dispose of spills or releases that may occur whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on site.
- .3 Promptly report spills and releases potentially causing damage to environment to:
 - .1 Authority having jurisdiction or interest in spill or release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.
 - .2 Owner of pollutant, if known.
 - .3 Person having control over pollutant, if known.
 - .4 Agency Representative.
- .4 Contact manufacturer of pollutant if known and ascertain hazards involved, precautions required, and measures used in cleanup or mitigating action.
- .5 Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.
- .6 Provide spill response materials including, containers, adsorbent, shovels, and personal protective equipment. Make spill response materials available at all times in which hazardous materials or wastes are being handled or transported. Spill response materials: compatible with type of material being handled.

1.11 EQUIPMENT DECONTAMINATION

- .1 Commence Work involving equipment contact with potentially contaminated material only after Equipment Decontamination Facility is operational.
- .2 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.
- .3 Perform equipment decontamination on Contractor-constructed equipment decontamination pad.
- .4 At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water to reduce amount of water needed and to reduce amount of contaminated rinsate generated. Use high-pressure, low-volume, hot water or steam supplemented by detergents or solvents as appropriate and as approved by the Agency Representative. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes and cleaning agent. Rinse off and collect cleaning agent. Air dry equipment in Clean Zone before removing from site or travelling on clean areas. Perform assessment as directed by the Agency Representative to determine effectiveness of decontamination.
- .5 Maintain inspection record on site which includes: equipment descriptions with identification numbers; time and date entering decontamination facility; time and date exiting decontamination facility; and name of inspector with comment stating that decontamination was performed and completed.

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- .6 Each piece of equipment will be inspected by the Agency Representative after decontamination and prior to removal from site and/or moved in clean areas. The Agency Representative reserves the right to require a more thorough decontamination if judged necessary.
- .7 Take necessary measures, including the installation of wind screens, to minimize the transport of spray droplets during decontamination.
- .8 Collect sediment and wastewater from decontamination activities that have accumulated on the decontamination area of the equipment. Transfer wastewater to the designated wastewater storage tank.
- .9 Transfer sediments into the vehicle that will transport them to the disposal site.
- .10 Personnel decontaminating equipment shall be equipped with personal protective equipment including appropriate disposable clothing, respiratory protection and face shield.
- .11 The Contractor shall have at its disposal adequate pumping equipment of sufficient capacity, as well as associated machines and piping, in good working order, to deal with ordinary emergencies, including power outages; he shall have at his service workers who are competent to operate the pumping equipment. Piping and fittings shall be kept in good condition, free of leaks.

1.12

WATER CONTROL

- .1 Maintain excavations free of water.
- .2 Protect site from puddling or running water. Grade site to drain
- .3 Prevent surface water runoff from leaving work areas.
- .4 Do not discharge decontaminated water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material, off site or to municipal sewers or to the Canal.
- .5 Prevent precipitation from infiltrating or from directly running off stockpiled waste materials. Cover stockpiled waste materials with an impermeable liner during periods of work stoppage including at end of each working day and as directed by the Consultant.
- .6 Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.
- .7 Control surface drainage including ensuring that gutters are kept open, water is not directed across or over pavements or sidewalks except through approved pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to suitable outlet.
- .8 Dispose of water in manner not injurious to public health or safety, to property, or to any part of Work completed or under construction.
- .9 Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other work areas free from water.

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- .10 Contain water from stockpiled waste materials. Transfer potentially contaminated surface waters to wastewater storage tanks separate from wastewater from Personnel Hygiene/Decontamination Facility.
- .11 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.
- .12 Contain and collect wastewaters and transfer such collected wastewaters to Contractor - supplied wastewater storage areas.

1.13 DEWATERING

- .1 Dewater various parts of Work including, without limitation, excavations, structures, foundations, and work areas.
- .2 Employ construction methods, plant procedures, and precautions that ensure Work, including excavations, are stable, free from disturbance, and dry.
- .3 Dewatering Methods and ice management: includes sheeting and shoring; groundwater control systems; surface or free water control systems employing ditches, diversions, drains, pipes and/or pumps; and other measures necessary to enable Work to be carried out in dry conditions.
- .4 Provide sufficient and appropriate labour, plant, and equipment necessary to keep Work free of water including standby equipment necessary to ensure continuous operation of dewatering system.
- .5 Take precautions necessary to prevent uplift of structure or pipeline and to protect excavations from flooding and damage due to surface runoff.
- .6 Test and analyse water generated from dewatering activities and treat to meet required discharge or disposal criteria.

1.14 EROSION AND SEDIMENT CONTROL

- .1 Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas, from stockpiles, staging areas, and other work areas. Prevent erosion and sedimentation.
- .2 Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as possible. Strip vegetation, regrade, or otherwise develop to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and water courses, and repair damage caused by soil erosion and sedimentation as directed by the Agency Representative.
- .3 Provide and maintain temporary measures which may include, silt fences, hay or straw bales, ditches, geotextiles, drains, berms, terracing, riprap, temporary drainage piping, sedimentation basins, vegetative cover, dikes, and other construction required to prevent erosion and migration of silt, mud, sediment, and other debris off site or to other areas of site where damage might result, or that might otherwise be required by Laws and Regulations. Make sediment control measures available during construction. Place silt

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fences and hay or straw bales in ditches to prevent sediments from escaping from ditch terminations.

- .4 Hay or Straw Bale: wire bound or string tied; securely anchored by at least 2 stakes or rebars driven through bale 300 mm to 450 mm.
- .5 Silt Fence: assembled, ready to install unit consisting of geotextile attached to driveable posts. Geotextile: uniform in texture and appearance, having no defects, flaws, or tears that would affect its physical properties; and contain sufficient ultraviolet ray inhibitor and stabilizers to provide minimum 2-year service life from outdoor exposure.
- .6 Net Backing: industrial polypropylene mesh joined to geotextile at both top and bottom with double stitching of heavy-duty cord, with minimum width of 750 mm.
- .7 Posts: sharpened wood, approximately 50 mm square, protruding below bottom of geotextile to allow minimum 450 mm embedment; post spacing 2.4 m maximum. Securely fasten each post to geotextile and net backing using suitable staples.
- .8 Plan construction procedures to avoid damage to work or equipment encroachment onto water bodies or drainage ditch banks. In event of damage, promptly take action to mitigate effects. Restore affected bank or water body to existing condition.
- .9 Installation:
 - .1 Construct temporary erosion control items as indicated. Actual alignment and/or location of various items as directed by the Agency Representative.
 - .2 Do not construct bale barriers and silt fence in flowing streams or in swales.
 - .3 Check erosion and sediment control measures weekly after each rainfall; during prolonged rainfall check daily.
 - .4 Bales and/or silt fence may be removed at beginning of work day, replace at end of work day.
 - .5 Whenever stripping vegetation, regrading, or other development causes sedimentation, remove it from adjoining surfaces, drainage systems, and watercourses, and repair damage as quickly as possible.
 - .6 Prior to or during construction, the Agency Representative may require installation or construction of improvements to prevent or correct temporary conditions on site. Improvements may include berms, mulching, sediment traps, detention and retention basins, grading, planting, retaining walls, culverts, pipes, guardrails, temporary roads, and other measures appropriate to specific condition. Temporary improvements shall remain in place and in operation as necessary or until otherwise directed by the Agency Representative.
 - .7 Repair damaged bales, end runs, and undercutting beneath bales.
 - .8 Unless otherwise indicated by the Agency Representative, remove temporary erosion and sediment control devices upon completion of Work. Spread accumulated sediments to form a suitable surface for seeding or dispose of, and shape area to permit natural drainage to satisfaction of the Agency Representative. Materials once removed become property of Contractor.
- .10 Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

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- .11 Do not disturb existing embankments or embankment protection.
- .12 Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- .13 If soil and debris from site accumulate in low areas, storm sewers, roadways, gutters, ditches, or other areas where it is undesirable, as judged by the Agency Representative, remove accumulation and restore area to original condition.

1.15 PROGRESS CLEANING

- .1 Maintain cleanliness of Work and surrounding site to comply with federal, provincial, and local fire and safety laws, ordinances, codes, and regulations.
- .2 Co-ordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

1.16 FINAL DECONTAMINATION

- .1 Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.
- .2 Perform decontamination as specified to satisfaction of the Agency Representative. The Agency Representative will direct Contractor to perform additional decontamination if required.

1.17 REMOVAL AND DISPOSAL

- .1 Remove surplus materials and temporary facilities from site.
- .2 Dispose of non-contaminated waste materials, litter, debris, and rubbish off site.
- .3 Do not burn or bury rubbish and waste materials on site.
- .4 Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
- .5 Do not discharge wastes into streams or waterways.
- .6 Dispose of following materials at appropriate off-site facility identified by Contractor and approved by the Consultant:
 - .1 Debris including excess construction material.
 - .2 Non-contaminated litter and rubbish.
 - .3 Disposable PPE worn during final cleaning.
 - .4 Wastewater removed from wastewater storage tank.
 - .5 Wastewater generated from final decontamination operations including wastewater storage tank cleaning.
 - .6 Lumber from decontamination pads.
- .7 Dispose of materials as directed by the Agency Representative.

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- .8 Wastewater sample and analysis: Agency Representative will perform sampling and analysis of stored wastewater for disposal purposes prior to removal from site. Results of analyses will determine appropriate methods of disposal. Upon receipt of analytical results, transfer tank contents without spills or release, as directed the Agency Representative . Following completion of tank emptying, decontaminate tank interior with steam or high-pressure water wash supplemented by detergent. Dispose of tank decontamination water with tank contents.
- .9 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.
- .10 Identify and evaluate recycling and reclamation options as alternatives to land disposal, such as:
 - .1 Hazardous wastes recycled in manner constituting disposal;
 - .2 Hazardous waste burned for energy recovery;
 - .3 Lead-acid battery recycling;
 - .4 Hazardous wastes with economically recoverable precious metals.

1.18 RECORD KEEPING

- .1 Maintain adequate records to support information provided to the Agency Representative regarding exception reports, annual reports, and biennial reports.
- .2 Maintain asbestos waste shipment records for minimum of 3 years from date of shipment or longer period required by applicable law or regulation.
- .3 Maintain bills of ladings for minimum of 375 days from date of shipment or longer period required by applicable law or regulation.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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HEALTH AND SAFETY REQUIREMENTS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
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- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
- .2 Loi sur la santé et la sécurité du travail, L.R.Q., c. S-2.1- updated 2014.
- .3 Health Canada, Workplace Hazardous Materials Information System (WHMIS)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit documents and samples required in accordance with section 01 33 00 – *Submittal Procedures*
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work:
 - .1 Contractor’s Health and Safety Plan
 - .2 Results of site specific safety hazard assessment.
 - .3 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
 - .4 Measures put in place to ensure the health and safety of employees at the site and visitors nearby.

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HEALTH AND SAFETY REQUIREMENTS

- .3 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to authority having jurisdiction, weekly, as well as to the Agency Representative.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit the WHMIS material safety data sheets (MSDS).
- .7 The Agency Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.4 FILING OF NOTICE

- .1 The Contractor shall not commence work until at least ten (10) days notice has been given by the Contractor to the *Commission des normes, de l'équité, de la santé et de la sécurité du travail* (CNESST). Within the scope of this contract, the Contractor shall take note that the acronym CNESST is equivalent to the acronym CSST.
 - .1 At least ten (10) days before the beginning of the work, send the notice of opening of site to the CNESST. Submit to the PCA Representative a copy of the notice of initiation and acknowledgment of receipt sent by CNESST.
 - .2 At least ten (10) days before the end of all work, the closing notice shall be sent to CNESST with a copy to the Agency Representative.
 - .3 The Contractor shall assume the role of the *maître d'œuvre* at all times within the boundaries of the work site and elsewhere where he / she is to perform work in the context of this project. The Contractor shall recognize the responsibility of the main contractor and thus identify himself in the site opening notice he sends to the CNESST.
 - .4 The Contractor shall agree to divide and identify the site appropriately, in order to define the time and space at all times during the duration of the project.
- .2 At least ten (10) days prior to the completion of the work, the Contractor shall provide CNESST with a notice to close the site.

1.5 INHERENT SITE RISKS

- .1 In addition to the risks related to the tasks to be performed, the personnel in charge of the work on the site will be exposed to the following risks, inherent to the place where the work will be carried out. Where the work will take place, there is notably presence of:
 - .1 Body of water;
 - .2 Work at height;
 - .3 Underground services (electricity, , aqueduct, etc.);
 - .4 Site restrictions and presence of machinery;

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HEALTH AND SAFETY REQUIREMENTS

- .5 Contaminated soil, mud paint and wood;
 - .6 Corridor of navigation;
 - .7 Vehicular and pedestrian traffic.
- .2 The Contractor shall conduct a risk assessment of the site to validate this information and see if other risks are present on the site. It shall include in its prevention program all the risks that have been identified.

1.6 SAFETY ASSESSMENT

- .1 Assess the risks and safety hazards present on the site in relation to the works to be performed.
- .2 It is the responsibility of the Contractor to conduct audits to ensure the safety of the employees at the site and visitors around the Chambly Canal.

1.7 MEETINGS

- .1 Schedule and administer Health and Safety meetings with the Agency Representative prior to commencement of Work.
- .2 Notify the Agency Representative at least five (5) days before this meeting.
- .3 A direct PCA representative shall be present at each meeting.

1.8 REGULATORY REQUIREMENTS

- .1 Perform the Works in accordance with the requirements of the authorities have jurisdiction in the City of Chambly.

1.9 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan shall address project specifications.
- .2 The Agency Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.
- .3 Always use the latest version of the standards in the Safety Code for the Construction Industry (S-2.1, r.4), notwithstanding the date indicated in this Code.

1.10 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work (L.R.Q., chapter S-2.1) and the Safety Code for the construction industry (S-2.1, r.4).
 - .1 Provide the Agency Representative with safe work planning;
 - .2 Ensure that workers on site receive the training and information necessary to perform work safely;

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HEALTH AND SAFETY REQUIREMENTS

- .3 Ensure that required protective equipment is available, in compliance with standards, laws and regulations;
- .4 Effectively direct and supervise work to ensure compliance with the security requirements set out in the contract documents, work orders and provisions of the Occupational Health and Safety Act and the Construction Safety Code as well as the prevention program of the site at all times;
- .5 Notify all workers that they have the right to refuse work that is hazardous to their health or safety;
- .6 No matter the size and location of the site, the Contractor shall clearly delineate the boundaries of the site by physical means; it shall also comply with the specific requirements of the regulations in this regard. The means chosen to delimit the site shall be submitted to the Agency Representative.
- .7 Take all necessary measures to protect the health and safety of workers and the public and any movable or immovable property on or off site and may be damaged by the performance of the work;
- .8 To appoint an engineer who is a member of the *Ordre des ingénieurs du Québec* when required by law or contract documents and in all cases where the temporary facilities and the methods of carrying out the work are such that the competence of an engineer is required;
- .9 Ensure maintenance and transmit to the Agency Representative a certificate of mechanical inspection for each piece of machinery used at the site;
- .10 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.11 COMPLIANCE REQUIREMENTS

- .1 Comply with the health and safety regulations, (RSQ, cS-21) and the Safety Code for the construction industry (S-2.1, r.4), in addition to complying with all the requirements of this contract.

1.12 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occurs during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province having jurisdiction and notify the Agency Representative verbally and in writing. Subsequently, the Contractor shall make the necessary modifications to the prevention program and put in place the necessary safety measures so that work can resume.

1.13 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator shall:
 - .1 Possess practical construction site experience involving activities associated with concrete repair, electrical works, and paving works.
 - .2 Have working knowledge of occupational safety and health regulations.

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HEALTH AND SAFETY REQUIREMENTS

- .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to the Agency Representative following his instructions.

1.14 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province Territory having jurisdiction.
- .2 At a minimum, the following information and documents shall be posted in a location readily accessible to workers:
 - .1 Notice of opening of the site;
 - .2 Identification of the project manager;
 - .3 Corporate OHS Policy;
 - .4 Site-specific prevention program;
 - .5 Emergency plan;
 - .6 Minutes of the site committee meetings;
 - .7 Names of representatives of the site committee;
 - .8 Names of emergency responders;
 - .9 Intervention and correction reports issued by CNESST.

1.15 CORRECTION OF NON-COMPLIANCE

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

1.16 VIOLENCE PREVENTION

- .1 Health and safety management on construction sites shall include the implementation of measures to protect the psychological health of all people who access the site where the work is taking place. Thus, in addition to physical violence, verbal abuse, bullying and harassment are not tolerated on the site. Anyone who demonstrates such gestures or behaviors will receive a warning and / or may be expelled from the site definitively by the Agency Representative.

1.17 BLASTING

- .1 Blasting and other use of explosives are not allowed.

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HEALTH AND SAFETY REQUIREMENTS

1.18 POWDER ACTUATED DEVICES

- .1 Use of powder actuated devices is prohibited for this contract.

1.19 WORK STOPPAGE

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

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT REFERENCES

- .1 U.S. Environmental Protection Agency (EPA)/Office of Water
 - .1 EPA 832/R-92-005, Storm Water Management for Construction Activities, Chapter 3.
 - .2 EPA General Construction Permit (GCP).
 - .3 Canadian Environmental Assessment Act, 2012.
 - .4 Fisheries Act (LRC 1985, c. F-15).
 - .5 Species at Risk Act (L.C. 2002, ch. 29).
 - .6 Migratory Birds Convention Act (L.C. 1994, ch. 22).
 - .7 Historic Canals Regulations (DORS/93-220).
 - .8 Recommandations canadiennes pour la qualité de l’environnement (CCME, 1999).
 - .9 Règlement numéro 2008-47 sur l’assainissement des eaux de la Communauté métropolitaine de Montréal.
 - .10 Critères de qualité de l’eau de surface (MDDELCC, 2015).

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ENVIRONMENTAL PROCEDURES

1.3 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.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets that include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - *Health and Safety Requirements*.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by the Agency Representative. The Environmental Protection Plan shall include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .4 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .5 The actions included in the Environmental Protection Plan shall be presented with a level of detail that is consistent with the environmental concerns and the construction works to be performed.
- .6 An Environmental Protection Plan Framework is provided to the Contractor by PCA for reference purpose. Contractor is free to use this format or his own format.
- .7 Include in Environmental Protection Plan :
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
 - .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Sediment Erosion and Sediment Prevention Plan, outlining measures to be implemented, including work monitoring and reporting to verify compliance with federal laws and regulations. Provincial and Municipal, and EPA 832 / R-92-005, Chapter 3.
 - .6 Drawings showing the location of temporary excavations or site trails landscaped with backfill, the crossing of rivers, materials, construction, sanitation facilities,

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ENVIRONMENTAL PROCEDURES

- deposits of surplus materials or contaminated materials; drawings showing the methods to be used to control runoff and to contain materials on the site.
- .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
 - .8 A plan of the work area, showing the activities planned in each part of the work area and indicating the restricted use areas as well as the prohibited areas of use.
 - .1 This plan shall include measures to mark the limits of useable areas and methods of protection of elements within authorized work areas and to be preserved.
 - .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance in addition to the Parks Canada Agency Supervisor and Project Authority, contact the following organizations without delay: Environment Canada: 1-866-283-2333, *Urgence-Environnement du Québec*: 1-866-694-5454 and La Garde Coastal Region: 1-800-363-4735.
 - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
 - .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .13 Waste Water Management Plan identifying methods and procedures for management discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water, disinfection water, hydrostatic test water, and water used in flushing of lines.
 - .14 A historical, archaeological, cultural resources biological resources and wetlands protection plan.

1.5 FIRES

- .1 Fires and burning of rubbish on site are not permitted.
- .2 Take necessary precautions to ensure site supervision and protection against incidents, in accordance with given instructions.

1.6 DISPOSAL OF WASTE

- .1 Unless expressly authorized by the Agency Representative, it is forbidden to bury rubbish and materials on site.

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ENVIRONMENTAL PROCEDURES

- .2 It is prohibited to dispose of waste materials or volatile materials such as mineral spirits and oil or paint thinners, by pouring them into waterways, storm sewers or sanitary sewers.

1.7 DRAINAGE

- .1 Develop and submit erosion and Sediment Control Plan (ESC) identifying type and location of erosion and sediment controls provided. Plan to include monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.8 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties as indicated by the Agency Representative.
- .2 Protect trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m minimum.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid driving and uselessly unloading or storing materials over the root zone of the protected trees.
- .4 The removal of trees and shrubs in the work zone is not permitted unless written authorization, by the PCA, is given before work has begun.

1.9 WORK NEAR RIVERS

- .1 Construction machinery shall be used from shore only. No machinery will have to circulate in the waterways.
- .2 Streams are to remain free of cuttings, rubbish or debris. No demolition debris should fall into a watercourse. In the event that demolition debris has accidentally escaped into a watercourse, it shall be immediately recovered.
- .3 Do not slide logs or construction materials from one side of the stream to another.
- .4 Blasting is prohibited on the site.
- .5 Treated wood residues and dusts shall not be discharged into watercourses or come into contact with runoff from a watercourse.

1.10 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.

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ENVIRONMENTAL PROCEDURES

- .3 Prevent sandblasting and other extraneous materials from contaminating air and waterways beyond application area.
 - .1 Provide temporary enclosures during the on-site cleaning and painting of steel surfaces.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .5 The engine of machinery and transport vehicles shall be turned off when idle for more than 15 minutes.
- .6 Use closed trucks or tarpaulins when transporting materials.
- .7 The Contractor and Subcontractors who perform work requiring the use of motorized equipment, fuel transfer or using dangerous products shall know and apply the procedures to be followed in the event of a spill. This procedure shall be posted at the sight of the employees at the work site.
- .8 The Contractor shall ensure that the machinery, tools and equipment that will be used in the execution of the work are safe, clean and in good working order. The Consultant reserves the right to refuse access or to remove from the site machinery, equipment and equipment that do not meet these requirements. Poorly maintained equipment with evidence of leaks or leakage will be removed from the site at the expense of the Contractor or the Equipment Owner, at no cost to the Customer.
- .9 The storage of petroleum products, general maintenance, refueling and cleaning of equipment and rolling stock shall be done more than 30 m from the watercourse.
- .10 The Contractor shall have emergency response kits at the work site. Kits shall contain a minimum of appropriate equipment and devices (oleophilic and water-repellent pads and absorbent materials, polyethylenes, waterproof bags, watertight containers, shovels, gloves, leaks, etc.) to contain spills to minimize risk the spread of contamination caused by a spill of oil, hazardous products or other contaminants.
- .11 Perform all handling of fuel, oil and other hazardous products under constant supervision to avoid accidental spills.
- .12 Hold a meeting with staff prior to commencement of work to inform them of environmental and safety contract requirements, including components of the contingency plan.
- .13 The wood treated at the factory or on the site shall be cured for a minimum of thirty (30) days, from the end of the application of treatment, before being installed in places in contact with a watercourse.
- .14 Treated wood can not be cut over a watercourse.
- .15 Chromed Copper Arsenate (CCA) treatment is required for lock gate components. All other elements (trench covers) shall be treated with another product. Chromed Copper Arsenate (CCA) treatment is not recommended in the PCA because of its toxicity (except for lock gate components). Quaternary copper (CAQ), copper arsenate (AC) and copper naphthenate (Ncu) are prioritized because they do not generate CEPA active ingredients.

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ENVIRONMENTAL PROCEDURES

- .16 Wood treated with Chromed Copper Arsenate (CCA) or Ammonium Copper and Zinc Arsenate (ACZA) shall be approved by the CSA Group or the American Wood Preserver Association (AWPA).
- .17 Wood treated with creosote, petroleum or pentachlorophenol can not be used on the site.
- .18 The mitigation and / or compensation measures described in Annex I *Mitigation measures* of this section shall be implemented to the satisfaction of the Departmental Representative.

1.11 HISTORICAL/ARCHAEOLOGICAL CONTROL

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

1.12 NOTIFICATION

- .1 The Agency Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform the Agency Representative of proposed corrective action and take such action for approval by the Agency Representative.
 - .1 Take action only after receipt of written approval by the Agency Representative .
- .3 The Agency Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 Not required

- .1 Not required.

Part 3 Execution

3.1 CLEANING

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

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ENVIRONMENTAL PROCEDURES

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

END OF SECTION

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QUALITY CONTROL

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT REFERENCES

- .1 Guide de contrôle de la qualité des enrobés à chaud (2018); Direction de la gestion des projet routiers; Ministère des Transport du Québec (MTQ).
- .2 Guide de contrôle de la qualité des sols et des granulats (2018); Direction de la gestion des projet routiers; Ministère des Transport du Québec (MTQ).
- .3 Guide de contrôle de la qualité du béton (2018) ; Direction de la gestion des projet routiers; Ministère des Transports du Québec (MTQ).

1.3 INSPECTION

- .1 Allow the Agency 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 the Agency Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections, or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

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QUALITY CONTROL

- .4 The PCA 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, PCA shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

- .1 **The Contractor is responsible to execute all require test** to make sure to respect contractual requirements (Concrete, pavement, soils and granular material).
- .2 The Agency Representative will be responsible for engaging the services of independent testing and inspection bodies (lab) in order to carry out additional tests. The cost of these services will be borne by the PCA. This does not absolve the Contractor to carry out tests to meet contractual requirements and provide test details and results.
- .3 Provide equipment required for executing inspection and testing by appointed agencies.
- .4 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by the Agency Representative at no cost to the PCA. Pay costs for retesting and reinspection.

1.5 ACCESS TO WORK

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

1.6 PROCEDURES

- .1 Notify appropriate agency and the Agency Representative in advance of requirement for tests, in order that attendance arrangements can be made.
- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by the Agency 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.

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QUALITY CONTROL

1.8 REPORTS

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

1.9 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.

1.10 MILL TESTS

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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CONSTRUCTION FACILITIES

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
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- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-last edition, Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59- last edition, Alkyd Exterior Gloss Enamel.
- .2 CSA Group (CSA)
 - .1 CSA-A23.1/A23.2- last edition, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121 last edition, Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2 last edition, Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321- last edition, Signs and Symbols for the Occupational Environment.
- .3 U.S. Environmental Protection Agency (EPA) / Office Water
 - .1 EPA 832-R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plan and Best Management Practices.

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CONSTRUCTION FACILITIES

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 INSTALLATION AND REMOVAL

- .1 The site limits shown on the drawings shall be strictly followed.
- .2 At all times, Contractor shall allow passage of visitors on walkways over upstream and downstream lock doors and shall prepare a plan for each site work configuration. Visitors accesses shall be fenced and maintained by Contractor during works.
- .3 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.
- .4 Identify areas which have to be gravelled to prevent tracking of mud.
- .5 Indicate use of supplemental or other staging area.
- .6 Provide construction facilities in order to execute work expeditiously.
- .7 Remove from site all such work after use.

1.5 SCAFFOLDING

- .1 Scaffolding in accordance with CAN/CSA-S269.2.
- .2 Provide and maintain temporary stairs, ladders, swing staging, ramps, platforms and scaffolding.

1.6 HOISTING

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

1.7 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.

1.8 CONSTRUCTION PARKING

- .1 The Contractor shall not obstruct the bike path or public ways. Provide and maintain adequate access to project site.
- .2 Provide and maintain adequate access ways to the site.
- .3 Clean the traffic lanes of all debris caused by the site.

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CONSTRUCTION FACILITIES

1.9 SECURITY

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

1.10 FIELD DRAINING

- .1 Provide temporary pumping and drainage facilities required to keep excavations and site free of standing water or ice.

1.11 WATER SUPPLY

- .1 The Contractor shall ensure his continuous supply of water during his work for his needs and provide all necessary measures for insulation of heating pipes according to temperature.
- .2 Make the necessary arrangements to connect the network to that of the utility company concerned, and assume all costs of installation, maintenance and disconnection.

1.12 TEMPORARY POWER SUPPLY AND TEMPORARY LIGHTING

- .1 The Contractor is responsible for the power supply required for his site.
- .2 No power source will be provided to the Contractor by PCA.
- .3 Make the necessary arrangements to connect the network to that of the utility company concerned, and assume all costs of installation, maintenance and disconnection.
- .4 Provide temporary lighting for the duration of the work and maintain the network.

1.13 OFFICES

- .1 Provide an office heated to 22 degrees C, lighted 750 lux and ventilated, of sufficient size to accommodate site meetings for a minimum of eight (8) people and furnished with a drawing laydown table. Office shall be supplied by Contractor directly on site. PCA does not provide any interior area to the Contractor.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors shall provide their own offices as necessary. Direct location of these offices.
- .4 Site office of the Agency Representative:
 - .1 Provide temporary office for the Agency Representative including a parking spot.
 - .2 Inside dimensions minimum 3.6 m long x 3 m wide x 2.4 m high, with floor 0.3 m above grade, complete with 4-50 % opening windows and one lockable door.
 - .3 Insulate building and provide heating system/cooling system to maintain 22 degrees C inside temperature at -20 degrees C outside temperature.
 - .4 Finish inside walls and ceiling with plywood, hardboard or wallboard and paint in selected colours. Finish floor with 19 mm thick plywood.

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CONSTRUCTION FACILITIES

- .5 Install electrical lighting system to provide min 750 lx using surface mounted, shielded commercial fixtures with 10 % upward light component.
- .6 The Agency Representative's site office must include a high-speed internet connection, with all connection and user fees paid for by the Contractor.
- .7 A photocopier-scanner (Color) with auto-charger in new condition, letter size (8 ½ x 11 inches), legal (8 ½ x 14 inches) and tabloid (11 x 17 inches) including stationery for the duration of contract; (Color photocopier-scanner required)
- .8 A fax machine letter (8 ½ x 11 inches) and legal (8 ½ x 14 inches), in new condition including stationery for the duration of the contract;
- .9 A microwave and small refrigerator (9 cubic feet minimum).
- .10 A hot/cold water dispenser including drinking water for the duration of the contract.
- .11 Provide private washroom facilities adjacent to office complete with flush or chemical type toilet, a sink supply with water and mirror and maintain supply of paper towels and toilet tissue.
- .12 Equip office with 1 x 2 m table, 1,2 m x 2,4 m table, 8 chairs, one office chair on wheels, garbage can, water dispenser, 6 m of shelving 300 mm wide, one 3 drawer filing cabinet, one plan rack and one coat rack and shelf.
- .13 The Contractor must keep in place the Agency Representative's office until the final work and quantities have been accepted by the Contractor and the Agency Representative or upon request of the Agency Representative.
- .14 The contractor shall clean the facilities on a weekly basis. These facilities include the Agency Representative's private washroom and office.
- .15 Maintain in clean condition.

1.14 STORAGE OF MATERIALS, MATERIALS AND TOOLS

- .1 Provide lockable, weatherproof sheds for storage of materials, equipment and tools, and keep them clean and orderly.
- .2 Leave on the site materials and equipment that do not have to be protected from the weather but ensure that they interfere as little as possible workflow.
- .3 No guarding will be provided by the Owner. The Contractor is responsible for any theft or damage that may occur on the work site.

1.15 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.

1.16 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three (3) weeks of signing Contract, in a location designated by Agency Representative.

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CONSTRUCTION FACILITIES

- .2 APC provides the electronic file of the panel according to its brand image. The Contractor shall ensure the printing on coroplast panels and install them on site at the time of mobilization.
- .3 No panel or sign other than the information panels shall be installed on site.
- .4 Provide and install signing panels for directing visitors near the site.
- .5 Provide construction panels consisting of a foundation, a frame including 3 copies of panels: 2 times (3'x4 ') for the bike path and 1 time (4'x6') for the public way, to be located as per Agency Representative's instructions.
 - .1 Foundations: 15 MPa concrete to CSA-A23.1 minimum 200 mm x 900 mm deep.
 - .2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.
 - .3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.
 - .4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CAN/CGSB 1.189.
 - .5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
 - .6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay, supplied by Consultant.
- .6 Locate project identification sign as directed by Consultant where indicated and construct as follows:
 - .1 Build concrete foundation, erect framework, and attach signboard to framing.
 - .2 Paint surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
 - .3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instruction supplied.
- .7 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols to CAN/CSA-Z321.
- .8 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Agency Representative.
- .9 In case of vandalism or damage, the Contractor shall supply new panels.

1.17 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Consultant.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

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CONSTRUCTION FACILITIES

- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic. Traffic on the bike path is permitted but shall be reduced to a minimum. Vehicles on the track shall be escorted by a signalman and drive at a very low speed. Ensure that the bearing capacity of the track or structures are sufficient to support the loads.
- .6 No storage or parking is allowed on the bike path.
- .7 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .8 Construct access and haul roads necessary.
- .9 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .10 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .11 Dust control: adequate to ensure safe operation at all times. Products used shall be submitted for approval prior to use.
- .12 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Consultant.
- .13 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .14 Provide snow, ice and water accumulation removal during period of Work. It is to be noted that the Bylaw on Historic Canal prohibits disposal of snow or ice in the Canal. Disposal in Richelieu River is also prohibited.
- .15 Remove, upon completion of work, haul roads designated by Agency Representative.

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

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CONSTRUCTION FACILITIES

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, specific to site that complies with EPA-832-R-92-005 and requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

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Partie 1 General

1.1 EXIGENCES CONNEXES

- .1 Section 01 11 00 *Summary of Work*
- .2 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .3 Section 03 10 00 *Concrete Forming and Accessories*
- .4 Section 03 20 00 *Concrete Reinforcing*
- .5 Section 03 30 00 *Cast in Place Concrete*
- .6 Section 04 03 07 *Historic - Masonry Repointing*
- .7 Section 04 03 08 *Historic - Mortaring*
- .8 Section 04 03 09 *Historic - Grouting*
- .9 Section 04 03 42 *Historic – Replacing of stone*
- .10 Section 04 05 00 *Common work results for masonry*
- .11 Section 05 50 00 *Metal Fabrications*
- .12 Section 06 05 73 *Wood Treatment*
- .13 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .14 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .15 Section 26 05 00 *Common Work Results for Electrical*
- .16 Section 26 05 05 *Selective Demolition for Electrical*
- .17 Section 26 05 20 *Wire and Box Connectors (0-1000 V)*
- .18 Section 26 05 21 *Wires and Cables (0-1000 V)*
- .19 Section 26 05 28 *Grounding: Secondary*
- .20 Section 26 05 29 *Hangers and Supports for Electrical Systems*
- .21 Section 26 05 30 *Fasteners and Seismic Devices.*
- .22 Section 26 05 32 *Outlet Boxes, Conduit Boxes and Fittings*
- .23 Section 26 05 34 *Conduits, Conduit Fastenings and Conduit Fittings*
- .24 Section 26 05 43.01 *Installation of Cables in Trenches and in Ducts*
- .25 Section 26 27 26 *Wiring Devices*
- .26 Section 26 28 13.01 *Fuses: Low Voltage*
- .27 Section 26 28 16.02 *Moulded Cases Circuit Breakers*
- .28 Section 26 28 23 *Disconnect Switches: Fused and Non-Fused*

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.29 Section 26 52 13.13 *Emergency Lighting*

.30 Section 26 52 13.16 *Exit Signs*

Annex I Mitigation Measures

1.2 REFERENCE STANDARDS

.1 CSA Group

.1 CSA G40.20/G40.21 latest edition, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.1 CSA W47.1, latest édition, Fusion Welding of Steel Company Certification .

.2 CSA W48 latest edition, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.3 CSA W59 latest edition, Welded Steel Construction (Metal Arc Welding)

.2 ASTM International, “American society for testing material”

.1 ASTM A48 Class 40, Standard Specification for Grey Iron Castings.

.3 AGMA, « American gear manufacturers association »

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit all documents as requested in the Contract Specifications.

.3 Submit to the Agency Representative, fabricator’s shop drawings of gears, racks and all mechanical elements in order to produce « As Built » Drawings. See paragraph below :
2.2 - Fabrication of gears and racks.

1.4 « AS BUILT PLANS AND DRAWINGS »

.1 Prepare and provide to the Agency Representative, a set of « As Built » drawings showing all modifications and alterations brought to the original plans and drawings (shown in red).

.2 The set shall be available at all times for consultation at a location determined by Agency Representative.

1.5 QUALITY ASSURANCE

.1 For fabrication as per plans and specifications, the Contractor shall prepare and submit his quality assurance and control program, including tests and inspections for fabrication work included in this specification.

.2 Contractor remains responsible for the quality of works done by its sub-contractors.

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- .3 Contractor shall undertake all fabrication erection and installation as per codes and standards mentioned in the contract plans and specification. If not specified, federal and provincial standards shall be used.

1.6 QUALITY CONTROL

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications and “Mill Test Reports”: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Prior to beginning of work, Contractor shall check all dimensions and sizes and inform by writing Agency Representative of any discordance .
- .4 Dimensions of material listed bill are informational only. Contractor shall supply sufficient material as to respect given sizes, allowances and methods as shown on elements detail drawings.
- .5 Any change in dimension and/or material and/or work method and/or substitute, shall be presented for approval to the Agency Representative prior to its implementation.
- .6 A review of shop drawings is required prior to shop fabrication. For this, a copy of shop drawings shall be submitted to the Agency Representative for validation and approval.
- .7 For equipment purchase, a review of shop drawings or technical data sheet is required prior to shop fabrication,.
- .8 A shop assembly test of components shall be done to the Agency Representative satisfaction.

1.7 QUALITY PLAN

- .1 Prior to beginning of works, the Contractor shall provide a quality plan integrating his control points as well as those of the Agency Representative (see below), and the quality control activities required in this specification.
- .2 Control points are crucial steps in the validation process which provide specification conformance to Agency Representative.
- .3 Passing of a control point authorizes the Contractor to undertake the following steps of the contract. Agency Representative maintains the right to add control points in the course of the project.
- .4 Submit documents required in Quality Plan five working days following control point.
- .5 Submit all documents included in Quality Plan within three working days following Agency Representative’s request.
- .6 Agency Representative control,points are as follows :
 - .1 Dimensional vérifications, available upon Agency Representative request.

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- .2 Weld quality, available upon Agency Representative request.
- .3 Verification of fabrication at 50 % completion and agreement on the corrections to be done, if any.
- .4 Verification of fabrication at 75 % completion and agreement on the corrections to be done, if any.
- .5 Verification of shop assembly of first sluice gate mechanism and first capstan and agreement on the modifications/corrections to be done, if any
- .6 Verification of Weld Inspection Report as per CSA W59 Standard, by an inspector certified under CSA W178.2 Standard.
- .7 VPO.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - *Common Product Requirements*.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Store materials in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
- .4 Replace defective or damaged materials with new.
- .5 Packaging Waste Management: remove for reuse of crates, padding, packaging materials, pallets, in accordance with Section 01 74 19 - *Waste Management and Disposal*.

Partie 2 Products

2.1 MATERIALS

- .1 Unless noted otherwise, materials shall conform to the following :
 - .1 Steel plates : according to CSA G40.20/G40.21.
 - .2 Grey Iron : according to ASTM A48 Classe 40
 - .3 Welding materials : According to CSA W59.
 - .4 Welding electrodes : according to CSA W48 serie.

2.2 FABRICATION OF GEARS AND RACKS

- .1 Gears and racks to be fabricated as per the survey of existing spare parts for Locks 1, 2 and 3. A list of gears and racks is given in the following table :

DRAWINGS	REFERENCE	DESCRIPTION	REMARK
RUC-20-212-MC.05	3A	GEAR 6 TOOTH (SLUICE GATE)	RU-C-23-161.13

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RUC-20-212-MC.05	3B	GEAR 61 TOOTH (SLUICE GATE)	RU-C-23-161.14
RUC-20-212-MC.05	2B	GEAR 9 TOOTH (SLUICE GATE)	RU-C-23-161.15
RUC-20-212-MC.06	4G	RACK (SLUICE GATE)	RU-C-23-161.21
RUC-20-212-MC.09	8B	GEAR 10 TOOTH (CAPSTAN)	RUC-20-212-MC.13
RUC-20-212-MC.09	8C	GEAR WHEEL (CAPSTAN)	RUC-20-212-MC.13
RUC-20-212-MC.09	8D	WORM (CAPSTAN)	RUC-20-212-MC.13
RUC-20-212-MC.10	10C	RACK (CAPSTAN)	RUC-20-212-MC.14

- .2 Gears to be fabricated by a AGMA certified fabricator.
- .3 A review of shop drawings is required prior to fabrication. To allow this review, a copy of shop drawing shall be transmitted to the Agency Representative for validation et approval.

2.3 CAPSTAN AND SLUICE GATE MECHANISIMS ASSEMBLY

- .1 Capstans to be assembled and adjusted in shop. Test and conformance report to be submitted.
- .2 Sluice gate mechanisms to be assembled and adjusted in shop. Test and conformance report to be submitted.

2.4 FINISHING

- .1 Painting: Refer to Section 09 91 13.23 – *Exterior Painting of Structural Steel*. “Paint System B” shall be applied to the door opening mechanisms and Sluice Gate opening mechanisms.

Partie 3 Exécution

3.1 MECHANICAL WORKS - GENERAL

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.

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- .4 Supply all components from other trades required to complete works as per requirements and submitted shop drawings.
- .5 When specifically called for, assemble elements on site.

3.2 EXAMINATION

- .1 Verification of Conditions: before proceeding with the mechanical works, verify conditions of substrates, supports and anchors previously installed under other Sections or Contracts acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
- .2 Visually inspect substrate, supports and anchors in presence of the Agency's Representative.
- .3 Inform the Agency's Representative of unacceptable conditions immediately upon discovery.
- .4 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed from the Agency's Representative.

3.3 CLEANING

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

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

3.5 DESCRIPTION DES TRAVAUX

- .1 Work for this contract include, without being limited to, the following :
 - .1 Complete dismantling of the hydraulic system, including the hydraulic pump unit, cylinders, supports, pivots, motors, pipes and conduits (including those on the bottom of the lock), instrumentation, controls, etc.
 - .2 Dismantling of old and installation and adjustment of new Capstans.
 - .3 Rack attachment plates on lock doors shall be installed and adjusted on site. Work will be done with other trades.
 - .4 Installation and adjustment of racks.

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- .5 Dismantling of old and installation and adjustment of new sluice gate mechanisms. Sluice gate mechanisms, preassembled with wooden support posts shall be installed and adjusted on doors on site. Work will be done with other trades.
- .6 Cleaning and reconditioning of site with proper disposal excess materials outside of PCA property.
- .7 All workmanship, materials and equipment required to complete the work according to plans and specifications.

FIN DE LA SECTION

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TRAFFIC CONTROL

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT REFERENCE STANDARDS

- .1 *Ministère des Transports du Québec (MTQ)*
 - .1 *Tome V – Signalisation routière – Volumes 1, 2 et 3*

1.3 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
- .2 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
- .3 Close lanes of road only after receipt of written approval from the Agency Representative.

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TRAFFIC CONTROL

- .1 A detour plan shall be submitted and previously approved by the agency. Allow a minimum of 5 business days for review and approval. It shall be in accordance with Volume V and the specific requirements of Parks Canada. Applicable for public ways including the bike path.
- .4 Keep travelled way graded, free from potholes and of sufficient width for required number of lanes of traffic.
 - .1 Provide 4.5 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.

1.4 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs, and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to the *Tome V*.
- .3 Place signs and other devices in locations recommended in the *Tome V*.
- .4 Meet with the Agency Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of the Agency Representative.
- .5 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.

1.5 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped to the *Tome V* for situations as follows:
 - .1 When a vehicle or machinery runs on the bike path.
 - .2 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .3 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .4 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .5 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .6 For emergency protection when other traffic control devices are not readily available.

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TRAFFIC CONTROL

- .7 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
- .8 At each end of restricted sections where pilot cars are required.
- .9 Delays to public traffic due to contractor's operators: 15 minutes maximum.

1.6 OPERATIONAL REQUIREMENTS

- .1 Not required.

Part 2 Products

- .1 Not required.

Part 3 Execution

- .1 Not required.

END OF SECTION

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TEMPORARY BARRIERS AND ENCLOSURES

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
 - .2 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-O121-FM1978(C2003), Douglas Fir Plywood.
 - .2 CSA O80, Wood preservation

1.3 INSTALLATION AND REMOVAL

- .1 Provide, install or lay out access works and temporary protections and controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 HOARDING

- .1 Erect, on the perimeter of the mobilization zones, a fence at least 1.8 m high of type "Omega ECO" or any equivalent accepted by the Agency Representative.

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TEMPORARY BARRIERS AND ENCLOSURES

- .2 Provide at least one lockable access barrier for trucks and at least one pedestrian door per mobilization zone. Provide padlocks and give the Agency Representative two (2) copies of the keys for the gates and doors.
- .3 Erect a confinement fencing on banks of the bicycle path and next to the visitor access to the upstream and downstream lock doors a new 1.8 m high of type "Omega ECO" or any equivalent accepted by the Agency Representative.
- .4 Install snow fences around trees and vegetation to be protected from damage by equipment or construction practices as instructed by the Agency Representative.
- .5 Install snow fences around surfaces to protect archaeological remains.
- .6 No signage will be authorized on the site (including construction fences, scaffolds, etc.), as much from the Contractor as its subcontractors.

1.5 GUARD RAILS AND BARRICADES

- .1 Provide secure, rigid guard rails and barricades around deep excavations, technical trenches, open stairways and along floor sills roofs and locks. Provide safety devices required for working at height.
- .2 Provide and install these devices according to the applicable laws and regulations.

1.6 SHELTERS AND ENCLOSURES AGAINST WEATHER

- .1 Provide watertight closures.
- .2 Arrange enclosures, where temporary heating is required, or isolate components in accordance with the requirements of the competent authorities.
- .3 Enclosures must be able to withstand wind pressures and overloads due to snow when applicable

1.7 DUST TIGHT SCREENS

- .1 Provide dust tight screens or insulated partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
- .2 Maintain and relocate protection until such work is complete.
- .3 In case of break or vandalism, repair or replace the dust tight screens.

1.8 TEMPORARY ACCESS STRUCTURES

- .1 Comply with laws, regulations, intergovernmental agreements or decrees from authorities which may at any time and in any way affect the work, labor, equipment, and materials.
- .2 Take responsibility and bear the costs of any claim or obligation that intend to break such laws, regulations, or decrees by the Contractor or its subcontractors or their respective employees.
- .3 Before starting work, the Contractor shall obtain, at his own expense, any licenses or permits required by the laws, decrees, or regulations.

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TEMPORARY BARRIERS AND ENCLOSURES

- .4 Describe, on the drawings of the temporary structures, the proposed method used for the repair of the Canal lock.
- .5 Shop Drawings, design calculations, and the Work Plan must be prepared, signed, and sealed by a Consultant engineer registered member in good standing of the *Ordre des ingénieurs du Québec*. The Work Plan must include structural calculations, the assumptions used for the calculations, the sequence of assembly and disassembly of the various elements, and any other related element.

1.9 ACCESS TO SITE

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

1.10 PUBLIC TRAFFIC FLOW

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

1.11 EMERGENCY ROUTES

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

1.12 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

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

1.13 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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COMMON PRODUCT REQUIREMENTS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT REFERENCE STANDARDS

- .1 References to relevant standards may be made in each section of the specifications.
- .2 Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether products or systems are in conformance with applicable standards, the Agency's Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 Cost for such testing will be born by the Contractor in event of non-conformance.

1.3 QUALITY

- .1 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .2 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of work.

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COMMON PRODUCT REQUIREMENTS

- .3 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4 Should disputes arise as to quality or fitness of products, decision rests strictly with the Agency Representative based upon requirements of Contract Documents.
- .5 Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.4 AVAILABILITY

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for items. The Parks Canada Agency does not allow additional time to the contract. If delays in supply of products are foreseeable, the Contractor shall, if necessary, file an equivalence application for approval.
- .2 In event of failure to notify the Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, the Agency's Representative reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.5 STORAGE, HANDLING AND PROTECTION

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

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COMMON PRODUCT REQUIREMENTS

1.6 TRANSPORTATION

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

1.7 MANUFACTURER'S INSTRUCTIONS

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

1.8 QUALITY OF WORK

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

1.9 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination of the works.

1.10 REMEDIAL WORK

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

1.11 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform the Agency's Representative of conflicting installation. Install as directed.

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COMMON PRODUCT REQUIREMENTS

1.12 FASTENINGS - GENERAL

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

1.13 FASTENINGS - EQUIPMENT

- .1 For the entire project, use 304 stainless steel parts.
- .2 For faces exposed to employee or visitor traffic (above walkways or steps), provide "Carriage bolt" round head fasteners made of stainless steel.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use only stainless steel washers.

1.14 PROTECTION OF WORK IN PROGRESS

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

1.15 EXISTING UTILITIES

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

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COMMON PRODUCT REQUIREMENTS

Part 3	Execution
3.1	NOT USED
.1	Not Used.

END OF SECTION

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EXAMINATION AND PREPARATION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practice in Place of Work, acceptable to the Agency's Representative.

1.3 SURVEY REFERENCE POINTS

- .1 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .2 Make no changes or relocations without prior written notice to the Agency's Representative.
- .3 Report to the Agency's Representative when reference point is lost or destroyed or requires relocation because of necessary changes in grades or locations.
- .4 Require surveyor to replace control points in accordance with original survey control.

1.4 SURVEY REQUIREMENTS

- .1 Establish two (2) permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

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EXAMINATION AND PREPARATION

- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for fill and topsoil placement and landscaping features.

1.5 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify the Agency's Representative of findings.

1.6 RECORDS

- .1 Maintain a detailed and accurate record of survey and verification work as it progresses.
- .2 Upon completion of work to repair the apron sections of the dam, prepare a certified topographic survey indicating the dimensions, location, angles and grade of the structures.
- .3 Record locations of maintained, re-routed and abandoned service lines.

1.7 INFORMATIONAL SUBMITTALS

- .1 Submit the name and address of the Surveyor to the Agency's Representative.
- .2 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
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- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENTATION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Submit a written request prior to any cutting and patching work that may affect the following:
 - .1 The structural integrity of any element of the structure;
 - .2 The integrity of elements exposed to the weather or water-repellent elements;
 - .3 Efficiency, maintenance or safety of functional elements;
 - .4 The aesthetic qualities of the visible elements;
 - .5 The work of the Owner or another contractor.
- .3 The request shall specify or include the following:
 - .1 Project designation;
 - .2 The location and description of affected items;
 - .3 A statement explaining why it is necessary to perform the required cutting and patching work;
 - .4 A description of the proposed work and the products to be used;

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EXECUTION

- .5 Alternatives to cutting and patching work;
- .6 The effects of cutting and patching work on those carried out by the Owner or another contractor;
- .7 The written permission of the contractor concerned;
- .8 The date and time when the work will be performed.

1.3 MATERIALS

- .1 Materials allowing the construction of work to the same likeness of the existing structure.
- .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00 - *Submittal Procedures*.

1.4 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.
- .6 The Contractor shall ensure to adequately protect the new paving stones and landscaping next to the « Logette ». Paving stones removed during works shall be given back to Parks Canada Agency.

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Remove or replace defective and or non-conforming elements or Works
- .4 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .5 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .6 Repair the Work with new products, as per the requirements of contractual documents.
- .7 Finish surfaces to ensure uniformity with adjacent finishes. In the case of continuous surfaces, finish up to the nearest intersection between two (2) elements; In the case of an assembly of elements, complete the entire finish.

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EXECUTION

1.6 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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CLEANING

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
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- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT REFERENCES

- .1 Historic Canal Regulations (SOR / 93-220)

1.3 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris including those generated by the Contractor and/or his subcontractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Agency's Representative. Do not burn waste materials on site.
- .3 Clear snow and ice from access to the site. Remove from site.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Provide on-site containers for collection of waste materials and debris.
- .6 Provide and use, for recycling purposes, separate and identifiable containers. Refer to Section 01 74 19 - *Waste Management and Disposal*.
- .7 Dispose of waste materials and debris at designated dumping areas in accordance to legislature.

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CLEANING

- .8 Establish the cleaning schedule in order to avoid the settlement of dust, debris or other dirt on humid, freshly painted surfaces.

1.4 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Rehabilitation of the site shall include addition of topsoil and lawn. It shall also provide maintenance to ensure the recovery of the lawn. Seeding will not be accepted.
- .3 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .4 Remove stains, spots, marks and dirt from decorative work.
- .5 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .6 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
- .7 Remove dirt and other debris from exterior surfaces.
- .8 Before submitting his final payment request, the Contractor shall have:
 - .1 Removed debris and waste materials and left the premises clean;
 - .2 Rehabilitated the premises of the Employer;
 - .3 Rehabilitated the roads and access roads taken by the Contractor.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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WASTE MANAGEMENT AND DISPOSAL

Part 1 General

1.1 SUMMARY

- .1 This Section includes requirements for management of construction waste and disposal, which forms the Contractor's commitment to reduce and divert waste materials from landfill and includes the following:
 - .1 Preparation of a Construction Waste Management Plan that provides guidance on a logical progression of tasks and procedures to be followed in a pollution prevention program to reduce or eliminate the generation of waste, the loss of natural resources, and process emissions through source reduction, reuse, recycling, and reclamation.
 - .2 Preparation of monthly progress reports indicating cumulative totals representing progress towards achieving diversion and reduction goals of waste materials away from landfill and identifying any special programs, landfill options or alternatives to landfill used during construction.
 - .3 Preparation of a Construction Waste Management Report containing detailed information indicating total waste produced by the project, types of waste material and quantity of each material, and total waste diverted and diversion rates indicated as a percentage of the total waste produced.

1.2 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
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WASTE MANAGEMENT AND DISPOSAL

1.3 WORK COVERED BY CONTRACT DOCUMENT REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM):
 - .1 ASTM E1609 01, Standard Guide for Development and Implementation of a Pollution Prevention Program
- .2 Recycling Certification Institute (RCI):
 - .1 RCI Certification Construction and Demolition Materials Recycling
- .3 Canadian Construction Association (CCA)
 - .1 CCA 81-2001 : A Best Practices Guide to Solid Waste Reduction
- .4 Public Works and Government Services Canada (PWGSC)
 - .1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.
 - .2 CRD Waste Management Market Research Report (available from PWGSC's Environmental Services).
 - .3 Sustainable Development Strategy 2007-2009: Target 2.1 Environmentally Sustainable Use of Natural Resources.

1.4 DEFINITIONS

- .1 Clean Waste: Untreated and unpainted; not contaminated with oils, solvents, sealants or similar materials.
- .2 Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, repair and demolition.
- .3 Hazardous: Exhibiting the characteristics of hazardous substances including properties such as ignitability, corrosiveness, toxicity or reactivity.
- .4 Non hazardous: Exhibiting none of the characteristics of hazardous substances, including properties such as ignitability, corrosiveness, toxicity, or reactivity.
- .5 Non toxic: Not poisonous to humans either immediately or after a long period of exposure.
- .6 Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- .7 Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- .8 Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form; recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Return: To give back reusable items or unused products to vendors for credit.
- .10 Reuse: To reuse a construction waste material in some manner on the project site.
- .11 Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

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WASTE MANAGEMENT AND DISPOSAL

- .12 Sediment: Soil and other debris that has been eroded and transported by storm or well production run off water.
- .13 Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- .14 Toxic: Poisonous to humans either immediately or after a long period of exposure.
- .15 Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- .16 Volatile Organic Compounds (VOC's): Chemical compounds common in and emitted by many building products over time through outgassing:
 - .1 Solvents in paints and other coatings;
 - .2 Wood preservatives; strippers and household cleaners;
 - .3 Adhesives in particleboard, fiberboard, and some plywood; and foam insulation.
 - .4 When released, VOC's can contribute to the formation of smog and can cause respiratory tract problems, headaches, eye irritations, nausea, damage to the liver, kidneys, and central nervous system, and possibly cancer.
- .17 Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.
- .18 Construction Waste Management Plan : A project related plan for the collection, transportation, and disposal of the waste generated at the construction site; the purpose of the plan is to ultimately reduce the amount of material being landfilled.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate waste management requirements with all Divisions of the Work for the project, and ensure that requirements of the Construction Waste Management Plan are followed.
- .2 Preconstruction Meeting: Arrange a pre-construction meeting in accordance with Section 01 31 19 – Project Meetings before starting any Work of the Contract attended by the Agency Representative, Contractor, and Consultant to discuss the Construction Waste Management Plan and to develop mutual understanding of the requirements for a consistent policy towards waste reduction and recycling.

1.6 SUBMITTALS

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

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WASTE MANAGEMENT AND DISPOSAL

Contractor will provide commentary before development of Construction Waste Management Plan.

- .2 Construction Waste Management Plan (CWM Plan) : Submit a CWM Plan for this project prior to any waste removal from site and that includes the following information:
 - .1 Material Streams: Analysis of the proposed jobsite waste being generated, including material types and quantities forming a part of identified material streams in the CWM Plan; materials removed from site destined for alternative daily cover at landfill sites and land clearing debris cannot be considered as contributing to waste diversion and will be included as a component of the total waste generated for the site.
 - .2 Recycling Haulers and Markets: Investigate local haulers and markets for recyclable materials, and incorporate into CWM Plan.
 - .3 Alternative Waste Disposal: Prepare a listing of each material proposed to be salvaged, reused, recycled or composted during the course of the project, and the proposed local market for each material.
 - .4 Landfill Materials: Identify materials that cannot be recycled, reused or composted and provide explanation or justification; energy will be considered as a viable alternative diversion strategy for these materials where facilities exist.
 - .5 Landfill Options: The name of the landfill where trash will be disposed of; landfill materials will form a part of the total waste generated by the project.
 - .6 Materials Handling Procedures: A description of the means by which any recycled waste materials will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
 - .7 Transportation: A description of the means of transportation of the recyclable materials, whether materials will be site separated and self hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site, and destination of materials.

1.7 QUALITY ASSURANCE

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

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WASTE MANAGEMENT AND DISPOSAL

1.8 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 (CWM PLAN) IMPLEMENTATION

- .1 Manager: Contractor is responsible for designating an on site party or parties responsible for instructing workers and overseeing and documenting results of the CWM Plan for the project.
- .2 Distribution: Distribute copies of the CWM Plan to the job site foreman, each Subcontractor, the Agency Representative, and other site personnel as required to maintain.
- .3 Instruction: Provide on site instruction of appropriate separation, handling, and recycling, salvage, reuse, composting and return methods being used for the project to Subcontractor's at appropriate stages of the project.
- .4 Separation Facilities: Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, composting and return:
 - .1 Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
 - .2 Hazardous wastes shall be separated, stored, and disposed of in accordance with local regulations.
- .5 Progressive Documentation: Submit a monthly summary of waste generated by the project to ensure that waste diversion goals are on track with project requirements:

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WASTE MANAGEMENT AND DISPOSAL

- .1 Submission of waste summary can coincide with application for progress payment, or similar milestone event as agreed upon between the Owner, Contractor and Agency's Representative.
- .2 Monthly waste summary shall contain the following information:
 - .1 The amount in tonnes or m³ and location of material landfilled,
 - .2 The amount in tonnes or m³ and location of materials diverted from landfill, and
 - .3 Indication of progress based on total waste generated by the project with materials diverted from landfill as a percentage.

3.2 SUBCONTRACTOR'S RESPONSIBILITY

- .1 Subcontractor's shall cooperate fully with the Contractor to implement the CWM Plan.

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WASTE MANAGEMENT AND DISPOSAL

3.3 SAMPLE CONSTRUCTION WASTE MANAGEMENT FORMS

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

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

END OF SECTION

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CLOSEOUT PROCEDURES

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead – Base Paint Abatement – Maximum Precautions*
- .2 Section 03 10 00 *Concrete Forming and Accessories*
- .3 Section 03 20 00 *Concrete Reinforcing*
- .4 Section 03 30 00 *Cast in Place Concrete*
- .5 Section 04 03 07 *Historic - Masonry Repointing*
- .6 Section 04 03 08 *Historic - Mortaring*
- .7 Section 04 03 09 *Historic - Grouting*
- .8 Section 04 03 42 *Historic – Replacing of stone*
- .9 Section 04 05 00 *Common work results for masonry*
- .10 Section 05 50 00 *Metal Fabrications*
- .11 Section 06 05 73 *Wood Treatment*
- .12 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .13 Section 09 91 13.23 *Exterior Painting of Structural Steel*
- .14 Annex I *Mitigation Measures*

1.2 WORK COVERED BY CONTRACT DOCUMENT REFERENCE STANDARDS

- .1 Canadian Environmental Protection Act (CEPA)
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.
- .2 Ministère des Transports du Québec (MTQ)
 - .1 General Specifications and Specifications - Road Infrastructure - Construction and Repair *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation* (CCDG), latest edition.

1.3 FINAL CLEANING

- .1 Clean in accordance with Section 01 74 11- Cleaning.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
 - .2 Grass damaged by work or mobilization shall be replaced by lawn in plate (P1) with topsoil in accordance with the requirements of the "Landscaping" section of the CCDG. Watering and the first cut shall be completed as directed by the Consultant. The Contractor shall allow a minimum time for the grip of the lawn.

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CLOSEOUT PROCEDURES

- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19- Waste Management and Disposal.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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CLOSEOUT SUBMITTALS

Part 1 General

1.1 REFERENCE STANDARDS

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

1.2 ADMINISTRATIVE REQUIREMENTS

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

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00- Submittal Procedures.
- .2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Agency's Representative, four (4) final copies of operating and maintenance manuals in English and French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.

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CLOSEOUT SUBMITTALS

- .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dwg format on USB key.
- .10 The project file shall be submitted for comments prior to the final version.

1.5 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Agency's Representative and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Schedule of work;
- .5 List of subcontractors and suppliers;
- .6 Reports of laboratory tests
- .7 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .8 Typewritten Text approved version: as required to supplement product data.
- .9 Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00- Quality Control.
- .10 Photographic report of the work: produce a weekly photographic report to present the construction stages and summaries of all the works.
- .11 All site and list instructions.
- .12 All Proposed Change Notices and List.
- .13 Guarantees.

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CLOSEOUT SUBMITTALS

- .14 Plans as built.

1.6 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site Consultant one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Agency's Representative.

1.7 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of black line opaque drawings, and a copy of Project Manual, provided by Consultant.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

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CLOSEOUT SUBMITTALS

- .4 Field changes of dimension and detail.
- .5 Changes made by change orders.
- .6 Details not on original Contract Drawings.
- .7 Referenced Standards to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.
- .6 Other Documents: maintain manufacturer's certifications and inspection certifications, required by individual specifications sections.
- .7 Provide digital photos, if requested, for site records.

1.8 FINAL SURVEY

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

1.9 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Provide servicing and lubrication schedule, and list of lubricants required.
- .6 Include manufacturer's printed operation and maintenance instructions.
- .7 Include sequence of operation by controls manufacturer.
- .8 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .9 Provide installed control diagrams by controls manufacturer.
- .10 Provide Contractor's co-ordination drawings,

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CLOSEOUT SUBMITTALS

- .11 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .12 Include test and balancing reports as specified in Section 01 45 00- Quality Control.

1.10 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
 - .1 Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual specifications sections.

1.11 MAINTENANCE MATERIALS

- .1 Not applicable

1.12 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and for review by Agency's Representative.

1.13 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, thirty (30) days before planned pre-warranty conference, to Agency's Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Agency's Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Agency's Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder, submit upon acceptance of work and organize binder as follows:

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CLOSEOUT SUBMITTALS

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within [ten] days after completion of applicable item of work.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Agency Representative's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .8 Provide a service call once the water lock for the final adjustments.
- .9 Conduct joint four (4) month and nine (9) month warranty inspection, measured from time of acceptance, by Agency's Representative.
- .10 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items and système.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one (1) year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.

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CLOSEOUT SUBMITTALS

- .12 Typical response time and repair time expected for various warranted equipment.
- .4 Contractor's plans for attendance at four (4) and nine (9) month post-construction warranty inspections.
- .5 Procedure and status of tagging of equipment covered by extended warranties.
- .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .11 Respond in timely manner to oral or written notification of required construction warranty repair work.
- .12 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Consultant to proceed with action against Contractor.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

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LEAD - BASE PAINT ABATEMENT - MAXIMUM PRECAUTIONS

Part 1 General

1.1 SUMMARY

- .1 Comply with requirements of this Section when performing following Work:
 - .1 Consider that existing steel surfaces covered with paint contain lead.
 - .2 Removal of lead based paint using power tools with an effective dust collection system equipped with HEPA filter.
 - .3 Abrasive blasting of lead based paint.

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Z180.1, latest edition, Compressed Breathing Air and Systems.
- .2 Department of Justice Canada
 - .1 Canadian Environmental Protection Act, latest edition
- .3 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS), Material Safety Data Sheets (MSDS).
- .4 Human Resources and Social Development Canada (HRSDC)
 - .1 Canada Labour Code Part II, - SOR 86-304 - Occupational Health and Safety Regulations.
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act, latest edition
- .6 U.S. Environmental Protection Agency (EPA)
 - .1 EPA 747-R-95-007, latest edition, Sampling House Dust for Lead.
- .7 U.S. Department of Health and Human Services/Centers for Disease Control and Prevention/National Institute for Occupational Safety and Health (NIOSH)
 - .1 NIOSH 94-113 - NIOSH Manual of Analytical Methods (NMAM, latest edition
- .8 U.S. Department of Labour - Occupational Safety and Health Administration (OSHA) - Toxic and Hazardous Substances
 - .1 Lead in Construction Regulation - 29 CFR 1926.62, latest edition
- .9 Underwriters' Laboratories of Canada (ULC)
- .10 Province of Quebec
 - .1 An Act Respecting Occupational Health and Safety, R.S.Q., c.S-2.1, latest edition.
 - .2 Règlement sur les matières dangereuses, dernière édition.

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LEAD - BASE PAINT ABATEMENT - MAXIMUM PRECAUTIONS

- .3 Guide de peinture des charpentes métalliques, chapitre 5 – Protection environnemental et mesures de sécurité, MTQ, dernière édition.

1.3 DEFINITIONS

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

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- .1 Maintain pressure differential of 5 to 7 Pa relative to adjacent areas outside of work areas. Machine to be equipped with alarm to warn of system breakdown, and equipped with instrument to continuously monitor and automatically record pressure differences.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Provide proof satisfactory to the Agency's Representative that suitable arrangements have been made to dispose of lead based paint waste in accordance with requirements of authority having jurisdiction.
- .3 Provide: Provincial and Federal , if applicable, requirements for Notice of Project Form.
- .4 Provide proof of Contractor's General and Environmental Liability Insurance.
- .5 Quality Control:
 - .1 Provide the Agency's Representative necessary permits for transportation and disposal of lead based paint waste and proof it has been received and properly disposed.
 - .2 Provide proof satisfactory to the Agency's Representative that employees had instruction on hazards of lead exposure, respirator use, dress, entry and exit from Work Area, and aspects of work procedures and protective measures.
 - .3 Provide proof that supervisory personnel have attended lead abatement course, of not less than two (2) days duration, approved by the Agency's Representative. Minimum of one (1) supervisor for every ten (10) workers.
- .6 Product Data
 - .1 Provide all relevant documentation and data , including analysis results, data relative to fire hazards and material flammability, and Safety Data Sheets (MSDS) of Workplace Hazardous Materials Information System (WHMIS), and of chemical products used, including :
 - .1 Paint products used;
 - .2 residues from removed paint;
 - .3 water that has been in contact with the paint to be removed;
 - .4 abrasives that came in contacts with the paint to be removed.
- .7 Procédures techniques
 - .1 Provide relevant documentation, including existing paint removal procedures, workers and visitors protection procedures, as well as waste residues management procedures. Technical procedures shall bear the signature of an Engineer licenced in the province of Quebec by the *Ordre des Ingénieurs du Québec (OIQ)*.

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: comply with Federal, Provincial/Territorial and local requirements pertaining to lead. In case of conflict among those requirements or with

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these specifications the more stringent requirement applies. Comply with regulations in effect at time work is performed.

- .2 Health and Safety:
 - .1 Require construction work to be in compliance with the occupational health and safety regulations in 01 35 29.06 - *Health and Safety Requirements*.
 - .2 Safety Requirements: worker and visitor protection.
 - .1 Protective equipment and clothing to be worn by workers while in Lead Work Area includes:
 - .1 Leads removal using power tool: respirator NIOSH approved and equipped with filter cartridges with assigned protection factor of 50, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Provide sufficient filters so workers can install new filters following disposal of used filters and before re-entering contaminated areas.
 - .2 Abrasive blasting of lead paint: NIOSH approved and equipped with filter cartridges with assigned protection factor of 1000, acceptable to Authority having jurisdiction. Suitable for type of lead and level of lead dust exposure in Lead Work Area. Respirator to be equivalent Type CE abrasive blast supplied air respirator operated in a pressure demand or positive pressure mode with a tight-fitting full-face-piece. Compressed air used to supply supplied air respirators to meet breathing air purity requirements of CAN/CSA-Z180.1. Where an oil-lubricated compressor is used to supply breathing air, a continuous carbon monoxide monitor/alarm to be provided.
 - .3 Disposable protective clothing that does not readily retain or permit skin contamination, consisting of full body covering including head covering with snug fitting cuffs at wrists, ankles, and neck.
 - .2 Requirements for workers:
 - .1 Remove street clothes in clean change room and put on respirator with new filters or reusable filters, clean coveralls and head covers before entering Equipment and Access Rooms or Work Area. Store street clothes, uncontaminated footwear, towels, and similar uncontaminated articles in clean change room.
 - .2 Remove gross contamination from clothing before leaving work area. Place contaminated work suits in receptacles for disposal with other lead contaminated materials. Leave reusable items except respirator in Equipment and Access Room. When not in use in work area, store work footwear in Equipment and Access Room. Upon completion of lead abatement, dispose of footwear as contaminated waste or clean thoroughly inside and out using

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- soap and water before removing from work area or from Equipment and Access Room.
- .3 Enter unloading room from outside dressed in clean coveralls to remove waste containers and equipment from Holding Room of Container and Equipment Decontamination Enclosure system. Workers shall not use this system as means to leave or enter Work Area.
 - .3 Eating, drinking, chewing, and smoking are not permitted in Work Area.
 - .4 Ensure workers are fully protected with respirators and protective clothing during preparation of system of enclosures prior to commencing actual lead abatement.
 - .5 Ensure workers wash hands and face when leaving Lead Work Area.
 - .6 Provide and post in Clean Change Room and in Equipment and Access Room the procedures described in this Section, in both official languages.
 - .7 Ensure no person required to enter Work Area has facial hair that affects seal between respirator and face.
 - .8 Visitor Protection:
 - .1 Provide protective clothing and approved respirators to Authorized Visitors to work areas.
 - .2 Instruct Authorized Visitors in use of protective clothing, respirators and procedures.
 - .3 Instruct Authorized Visitors in proper procedures to be followed in entering into and exiting from Work Area.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for in accordance with Section 01 74 21 - *Construction/Demolition Waste Management and Disposal*.
- .2 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
- .3 Disposal of lead waste generated by removal activities shall comply Provincial, and Municipal regulations. Dispose of lead waste in sealed double thickness 6 ml bags or leak proof drums. Label containers with appropriate warning labels.
- .4 Provide manifests describing and listing waste created. Transport containers by approved means to licensed landfill for burial.

1.7 SCHEDULING

- .1 Not later than two (2) days before beginning Work on this Project notify the following in writing; where appropriate.
 - .1 Medical Services Branch, Health Canada.
 - .2 Responsible Authority of Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST)

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LEAD - BASE PAINT ABATEMENT - MAXIMUM PRECAUTIONS

- .3 Disposal Authority.
- .2 Inform sub trades of presence of lead-containing materials identified in Existing Conditions.
- .3 Provide the Agency Representative a copy of notifications prior to start of Work.

Part 2 Products

2.1 MATERIALS

- .1 Polyethylene 0.15 mm unless otherwise specified; in sheet size to minimize joints.
- .2 FR polyethylene: 0.15 mm woven fibre reinforced fabric bonded both sides with polyethylene.
- .3 Tape: fibreglass - reinforced duct tape suitable for sealing polyethylene under dry conditions and wet conditions using amended water.
- .4 Lead waste containers: acceptable to dump operator with tightly fitting covers and 0.15 mm sealable polyethylene liners.
 - .1 Label containers with pre-printed bilingual cautionary Warning Lead clearly visible when ready for removal to disposal site.

Part 3 Execution

3.1 SUPERVISION

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

3.2 PREPARATION

- .1 Remove and wrap items to be salvaged or reused, and transport and store in area specified by Agency's Representative.
- .2 Work Area:
 - .1 Pre-clean fixed casework, and equipment within work areas, using HEPA vacuum and cover with polyethylene sheeting sealed with tape.
 - .2 Clean work areas using HEPA vacuum. If not practicable, use wet cleaning method. Do not use methods that raise dust, such as dry sweeping, or vacuuming using other than HEPA vacuum.
 - .3 Install negative pressure machine system and operate continuously from installation of polyethylene sheeting until completion of final cleanup. Provide automatic continuous monitoring and recording instrument of pressure difference.
 - .4 Seal off openings, corridors, doorways, windows, skylights, ducts, grilles, and diffusers, with polyethylene sheeting sealed with tape.

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LEAD - BASE PAINT ABATEMENT - MAXIMUM PRECAUTIONS

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

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LEAD - BASE PAINT ABATEMENT - MAXIMUM PRECAUTIONS

- .2 Construct curtain doorways between enclosures so when people move through or waste containers and equipment are moved through doorway, one of two closure comprising doorway always remains closed.
- .3 Shower room in decontamination facility to be provided with the following:
 - .1 Hot and cold water or water of constant temperature not less than 40 degrees Celsius or more than 50 degrees Celsius.
 - .2 Individual controls inside to regulate water flow and temperature.
- .4 Prior to each shift in which a decontamination facility is being used, a competent person should inspect the facility to ensure that there are no defects that would allow lead-containing dust to escape. Defects should be repaired before the facility is used. The decontamination facility should be maintained in a clean and sanitary condition.
- .5 Maintenance of Enclosures:
 - .1 Maintain enclosures in tidy condition.
 - .2 Ensure barriers and polyethylene linings are effectively sealed and taped. Repair damaged barriers and remedy defects immediately.
 - .3 Visually inspect enclosures at beginning of each working day.
 - .4 Use smoke test method to test effectiveness of barriers as directed by Agency's Representative.

3.3 LEAD - BASE PAINT ABATEMENT

- .1 Refer to article 1.1 *Summary* of the present section.
- .2 Removal of lead-containing coatings by mechanical tools connected to vacuum cleaners with dust collection and very high efficiency filters.
- .3 Remove lead based paint in small sections and pack as it is being removed in sealable 0.15 mm plastic bags and place in labelled containers for transport.
- .4 Wet method to be used to reduce dust generation. Examples of wet methods include wetting surfaces, wet scraping, and wet shovelling. Wet method shall not be used if it creates a hazard or cause damage to equipment or to project. Power tools to be equipped with a shroud, and to be kept flush with surface.
- .5 Seal filled containers. Clean external surfaces thoroughly by wet sponging. Remove immediate from working area to staging area. Clean external surfaces thoroughly again by wet sponging before moving containers to decontamination Washroom. Wash containers thoroughly in decontamination Washroom, and store in Holding Room pending removal to Unloading Room and outside. Ensure containers are removed from Holding Room by workers who have entered from uncontaminated areas dressed in clean coveralls.
- .6 After completion of stripping work, wire brush and wet sponge surface to remove visible material. During this work keep surfaces wet. After wire brushing and wet sponging, wet clean and HEPA vacuum entire work area including Equipment and Access Room. Compressed air or dry sweeping shall not be used to clean up lead-containing dust or waste. After inspection and approval by the Consultant apply continuous coat of slow

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LEAD - BASE PAINT ABATEMENT - MAXIMUM PRECAUTIONS

drying sealer to surfaces. Do not disturb work area for 8 hours, no entry, activity, or ventilation other than operation negative air machine during this period.

3.4 INSPECTION

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

3.5 LEAD SURFACE SAMPLING - WORK AREAS

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

3.6 FINAL CLEANUP

- .1 Following specified cleaning procedures, and when lead wipe sampling is below acceptable concentrations proceed with final cleanup.
- .2 Remove polyethylene sheet by rolling it away from walls to centre of work area. Vacuum visible lead containing particles observed during cleanup, immediately, using HEPA vacuum.
- .3 Place polyethylene sheets, tape, cleaning material, clothing, and contaminated waste in plastic bags and sealed labelled waste containers for transport.

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LEAD - BASE PAINT ABATEMENT - MAXIMUM PRECAUTIONS

- .4 Clean up Work areas, Equipment and Access Room, and other contaminated enclosures.
- .5 Remove sealed waste containers and equipment used in Work and remove from work areas at appropriate time in cleaning sequence.
- .6 Conduct final check to ensure no dust or debris remain on surfaces as result of dismantling operations.

3.7 RE-ESTABLISHMENT OF OBJECTS AND SYSTEMS

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

END OF SECTION

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CONCRETE FORMING AND ACCESSORIES

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 20 00 *Concrete Reinforcing*
- .2 Section 03 30 00 *Cast in Place Concrete*

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2, latest edition, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-O86, latest edition, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
 - .3 CSA S269.1, latest edition, Falsework for Construction Purposes.
 - .4 CAN/CSA-S269.3, latest edition, Concrete Formwork, National Standard of Canada
- .2 Ministère des Transports du Québec (MTQ)
 - .1 General Specifications and Specifications - Road Infrastructure - Construction and Repair *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation* (CCDG), latest edition.
 - .2 Tome VII – Materials, Standard 3101, Normal Density Concrete, *Béton de masses volumiques normales*.
 - .3 Tome VII – - Materials, Standard 3501, Curing Materials, *Matériaux de cure*.
 - .4 Tome VII – Materials, Standard 3801, Cementitious Bag Mortars, *Mortiers cimentaires en sac*.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Implementation Meeting: One (1) week prior to start of concrete work, hold a meeting in accordance with Section 01 31 19- Project Meetings.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Technical datasheets:
 - .1 Submit the required data sheets as well as the manufacturer's instructions and documentation regarding the exclusive materials used for the form linings and coatings. The data sheets shall indicate the characteristics of the products, the performance criteria, the dimensions, the limits and the finish.
 - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 29.06- Health and Safety Requirements and Section 01 35 43- Environmental Procedures.
- .3 Submit shop drawings for formwork and falsework.

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CONCRETE FORMING AND ACCESSORIES

- .1 Submit drawings stamped and signed by professional engineer registered or licensed in the province of Quebec by the *Ordre des Ingénieurs du Québec*.
- .2 Prepare Shop Drawings in accordance with CSA S269.1 for formwork and falsework.
- .3 Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.
- .4 Indicate sequence of erection and removal of formwork/falsework as directed by Agency's Representative.
- .5 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts.
- .6 Indicate sequence of erection and removal of formwork and falsework.
- .7 Include the following information on falsework Shop Drawings:
 - .1 Longitudinal, lateral, vertical, dead, live and impact loads used in design.
 - .2 Safe bearing capacity of soil underneath mud sills.
 - .3 Maximum column, post and support loads.
 - .4 Deflection diagrams for beams with deflection of 10 mm or more.
 - .5 Deflection diagrams indicating initial and final elevation of deck surfaces, roofs and soffits.
 - .6 Grade of structural steel.
 - .7 Indicate steel posts, girders, beams, connections, bracing and welding, providing sufficient detail for safe performance of falsework.
 - .8 Fully detailed steel frame shoring.
 - .9 Species, grades and sizes of wood.
 - .10 Type and weight of equipment (moving or stationary) supported by falsework.
 - .11 Sequence, methods and rate of concrete placement.
 - .12 Proprietary equipment, adequately identified for checking purposes.
 - .13 Full details and locations of splices.

1.5 DELIVERY, STORAGE AND HANDLING

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

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CONCRETE FORMING AND ACCESSORIES

Part 2 Products

2.1 MATERIALS

- .1 Formwork materials:
 - .1 Surfaces shall be made of plywood panels not less than 15 mm thick. These panels shall measure at least 2400 mm over at least 600 mm, wherever the dimensions of the structure permit. The wood shall be in new condition; The corners and edges shall be intact and the surface shall be smooth. The panels shall be positioned symmetrically with respect to the center line of the work to be concreted.
- .2 Form ties:
 - .1 Use form ties, at least 12 mm in diameter, of hot-dip galvanized steel with a plastic cone screwed at their ends adjoining the formwork, removable and at least 40 mm in length.
- .3 Falsework materials: to CSA-S269.1, last edition.

Part 3 Execution

3.1 FABRICATION AND ERECTION

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Obtain the Agency's Representative's approval for use of earth forms framing openings not indicated on drawings.
- .3 It is forbidden to cast concrete directly in soil without vertical formwork..
- .4 Fabricate and erect falsework in accordance with CSA S269.1.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.
- .6 Apply a form removal agent
- .7 Align form joints and make watertight.
 - .1 De not add, move, modify the position of the construction joints without authorization by the Agency's Representative.
- .8 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .9 Incorporate anchors, sleeves and other elements embedded in concrete as shown on contractual drawings.
- .10 Determine the level of pours from the top of the formwork by a molding, remove the molding before proceeding with the next casting.

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CONCRETE FORMING AND ACCESSORIES

- .11 Prior to pouring concrete, clean formwork in accordance with CSA A23.1 / A23.2, latest edition.
- .12 The temperature of the formwork, including the bottom and the reinforcing steel in place, shall be at a temperature of not less than 10 degrees Celsius prior to commencing the concreting of the structure; provide heating when required.

3.2 REMOVAL AND RESHORING

- .1 After pouring the concrete, leave the formwork in place for at least three (3) days.
- .2 Remove formwork when concrete has reached 70 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.
- .3 The formwork shall be considered removed once it has been loosened and a part of it is no longer in contact with the concrete.
- .4 The requirements related to concrete cure shall be applied in sequence with the formwork removal if the formwork is removed before the curing period, in accordance to Section 03 30 00 – *Cast in place concrete*.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - *Cleaning*.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - *Cleaning*.

END OF SECTION

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CONCRETE REINFORCING

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 10 00 *Concrete Forming and Accessories*
- .2 Section 03 30 00 *Cast in Place Concrete*

1.2 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI)
 - .1 SP-66, ACI Detailing Manual 2004.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM A123/A123M, last edition, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .2 ASTM A143/A143M, last edition, Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
 - .3 ASTM A185/A185M, last, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
 - .4 ASTM A775/A775M, last edition, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .3 CSA Group
 - .1 CSA-A23.1/A23.2 last edition, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A23.3 last edition, Design of Concrete Structures.
 - .3 CSA-G30.18 last edition, Carbon Steel Bars for Concrete Reinforcement.
 - .4 CSA-G40.20/G40.21 last edition, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .5 CAN/CSA-G164 last edition, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .6 CSA W186 last edition, Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .4 Reinforcing Steel Institute of Canada (RSIC)
 - .1 RSIC last edition, Reinforcing Steel Manual of Standard Practice.
- .5 Ministère des Transports du Québec (MTQ)
 - .1 General Specifications and Specifications - Road Infrastructure - Construction and Repair *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation* (CCDG), latest edition.
 - .2 Tome VII – Materials, Standard 5105, *Armatures pour les ouvrages de béton*, Reinforcement bars for concrete

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CONCRETE REINFORCING

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Reinforcement drawings shall be carried out in accordance with the Recommended Standards Manual, published by the RSIC.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed by the *Ordre des ingénieurs du Québec (OIQ)*.
 - .1 Indicate placing of reinforcement and:
 - .1 Bar bending details.
 - .2 Lists.
 - .3 Quantities of reinforcement.
 - .4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by the Consultant, with identifying code marks to permit correct placement without reference to structural drawings.
 - .5 Indicate sizes, spacings and locations of chairs, spacers and hangers.
 - .2 Detail lap lengths and bar development lengths to CAN/CSA-A23.3, unless otherwise indicated.

1.4 QUALITY CONTROL

- .1 Quality Assurance:
 - .1 Factory Test Reports: At least four (4) weeks prior to installation of the frames, provide the Agency's Representative with a certified copy of the test report of the steel frames that have been completed at the factory.
 - .2 Submit in writing to the Agency's Representative, the proposed source of supply for the reinforcing materials to be supplied.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - *Common Product Requirements*.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Develop Waste Reduction Work plan related to Work of this Section.

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CONCRETE REINFORCING

Part 2 Products

2.1 MATERIALS

- .1 Ensure that frames are free from dirt, rust, splash of hardened concrete from previous concrete, oil or other debris.
- .2 Ensure that frames to be used are not deformed or twisted.
- .3 Reinforcement bars: high adhesion bars, grade 400W, in accordance with CSA G30.18.
- .4 Ligating wire: annealed and cold drawn steel wire, conforming to ASTM A82 / A82M.
- .5 Rebar and wire to be galvanized.
- .6 Galvanizing of non-prestressed reinforcement: to ASATM A123, minimum zinc coating 610 g/m².
 - .1 Protect galvanized reinforcing steel with chromate treatment to prevent reaction with Portland cement paste.
 - .2 If chromate treatment carried out immediately after galvanizing, soak steel in aqueous solution containing minimum 0.2% by weight sodium dichromate or 0.2% chromic acid.
 - .1 Temperature of solution minimum 32 degrees and galvanized steels immersed for minimum 20 seconds.
 - .3 If galvanized steels at ambient temperature, add sulphuric acid as bonding agent at concentration of 0.5% to 1%.
 - .1 No restriction applies to temperature of solution.
 - .4 Chromate solution sold for this purpose may replace solution described above, provided if of equivalent effectiveness.
 - .1 Provide product description as described in Section 01 33 00 - *Submittal Procedures*.
- .7 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

2.2 FABRICATION

- .1 Fabricate reinforcing steel in accordance with CSA-A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada.
- .2 Obtain Agency's Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.
- .3 Ship bundles of reinforcement bars, clearly identified in accordance with bar bending details and lists.
- .4 Apply tolerances for length and bend of reinforcement specified in Figure 6.1 of the RSIC Recommended Standards Manual.
- .5 Unless specified in drawings and specifications, apply the minimum length of 600 mm to the overlap between the bars to be connected to each other as a result of work performed in several distinct phases.

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CONCRETE REINFORCING

2.3 SOURCE QUALITY CONTROL

- .1 Rebar shall be from a Canadian steel mill that holds a certificate of registration in accordance with ISO 9001: 2008 - Quality Management Systems.
- .2 At least two (2) weeks prior to delivery of the bars to the site or manufacturing plant, provide the Agency's Representative with a certified copy of the report of the tests carried out at the steel plant showing the results of the physical and Chemical properties of reinforcing steel.

Part 3 Execution

3.1 PREPARATION

- .1 Galvanizing to include chromate treatment.
 - .1 Duration of treatment 1 hour per 25 mm of bar diameter.
- .2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 FIELD BENDING

- .1 Unless otherwise indicated or permitted by the Agency's Representative, rebar shall not be bent or welded to the site.
- .2 When bending on site is permitted, fold bars without heating, slowly applying constant pressure.
 - .1 Mechanically fold cold.
- .3 Replace bars with cracks or splits.

3.3 REBAR PLACEMENT

- .1 Install rebar in accordance with drawings and CAN / CSA-A23.1 / A23.2.
- .2 Prior to placing concrete, obtain the Agency's Representative's approval of reinforcing material and placement.
- .3 Maintain cover to reinforcement during concrete pour.
- .4 Fasten reinforcing bars securely with steel wires to prevent movement when placing concrete:
 - .1 Fasten reinforcements to all intersections if these intersections are 300 mm or more in distance or at both intersections if this distance is less.
 - .2 In the case of repairs, reinforcements shall also be secured to the form fittings.
 - .3 To bond reinforcement, use annealed steel wire with a diameter of at least 1.6 mm (16 gauge). For the galvanized steel frame, use galvanized steel wire. Fold the wires so as to obtain the same coating as that required for the reinforcements.
- .5 Use spaced plastic spacers spaced 1200 mm from center to center to maintain reinforcements at required distance from formwork, floor or existing concrete:

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CONCRETE REINFORCING

- .1 Use plastic circular spacers with the center fixed to the frame to hold the reinforcing layers of 15 M and 20 M bars.
- .2 Use plastic shims to hold up to 25M or larger slab reinforcement layers in upright position.
- .3 Use continuous shims with plastic-coated wires and plastic tabs to hold the reinforcement layer that is closest to the existing formwork, floor or concrete in a horizontal position.
- .6 Unless otherwise indicated in the drawings and specifications, use individual plastic shims for other horizontal reinforcement layers.

3.4 FIELD TOUCH-UP

- .1 Using a finish approved by Agency's Representative, apply two (2) coats of zinc-rich paint to the damaged surfaces of the galvanized coating and to the cut surfaces of the galvanized Obtain a continuous coating.
 - .1 Zinc-rich coating shall have a minimum content of 87% zinc metal in the dry film. The minimum total thickness of the dry coating film shall be 130 µm.

3.5 CLEANING

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

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CAST-IN-PLACE CONCRETE

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 03 10 00 *Concrete Forming and Accessories*
- .2 Section 03 20 00 *Concrete Reinforcing*

1.2 REFERENCE STANDARDS

- .1 American Concrete Institute (ACI)
 - .1 SP-66, ACI Detailing Manual
- .2 ASTM International
 - .1 ASTM C260/C260M, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C1017/C1017M, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
- .3 CSA International
 - .1 CSA A23.1/A23.2 Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283, Qualification Code for Concrete Testing Laboratories.
 - .3 CSA A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .4 Ministère des Transports du Québec (MTQ)
 - .1 General Specifications and Specifications - Road Infrastructure - Construction and Repair *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation* (CCDG), latest edition.
 - .2 Tome VII – Materials, Standard 3101, Bétons de masse volumique normale, Normal density Concrete

1.3 ABBREVIATIONS AND ACRONYMS

- .1 Portland Cement: hydraulic cement, blended hydraulic cement (XXb - b denotes blended) and Portland-limestone cement types:
 - .1 GU, GUb and GUL - General use cement.
 - .2 MS and MSb - Moderate sulphate-resistant cement.
 - .3 MH, MHb and MHL - Moderate heat of hydration cement.
 - .4 HE, HEb and HEL - High early-strength cement.

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CAST-IN-PLACE CONCRETE

- .5 LH, LHb and LHL - Low heat of hydration cement.
- .6 HS and HSb - High sulphate-resistant cement.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Testing inspection and follow-up register
 - .1 Provide testing inspection results reports for review by the Agency's Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .3 Supply concrete pouring procedure
 - .1 Provide the concrete pouring procedures to the Agency's Representative for approval. This procedure shall describe the proposed methods of work and the proposed methods for the quality control (Quality management plan).
- .4 Supply technical specifications and descriptions sheets
 - .1 Submit the required technical and/or descriptive data sheets as well as the manufacturer's documentation of the concrete type, concrete mixing equipment and any other products or equipment required for concreting to the Agency's Representative. The data sheets shall indicate the characteristics of the products, the performance criteria, the dimensions, the limits, and the finish.
- .5 Batch of concrete registry
 - .1 Provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature, and test samples taken as described in PART 3 - FIELD QUALITY CONTROL.
- .6 Concreting Notice
 - .1 Submit, in writing, a concreting notice at least twenty-four (24) hours prior to commencement of concreting to the Agency's Representative.
- .7 Concrete hauling time
 - .1 Provide for review by Agency's Representative deviations exceeding maximum allowable time of one hundred and twenty (120) minutes for concrete to be delivered to site of Work and discharged after batching.

1.5 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - *Quality Control*.
- .2 Provide the Agency's Representative, minimum two (2) weeks prior to starting concrete work, with a valid and recognized certificate from the plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

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CAST-IN-PLACE CONCRETE

- .3 Minimum two (2) weeks prior to starting concrete work, provide proposed quality control procedures for review by Agency's Representative on following items:
 - .1 Falsework erection.
 - .2 Hot weather concrete.
 - .3 Cold weather concrete.
 - .4 Curing.
 - .5 Finishes.
 - .6 Formwork removal.
 - .7 Joints.
 - .8 Bad meteorological conditions.
 - .9 Quality Control Plan: provide written report to the Consultant verifying compliance that concrete in place meets performance requirements of concrete as established in PART 2 - PRODUCTS.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements in accordance with Section 01 61 00 – General Product Requirements.
- .2 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Modifying maximum time limit without receipt of prior written agreement from Consultant and concrete producer as described in CSA A23.1/A23.2. is prohibited.
 - .2 Deviations submitted for review by Agency's Representative.
 - .3 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.
- .3 Packaging Waste Management: remove for reuse in accordance with Section 01 74 19- Waste Management and Disposal.

1.7 SITE CONDITIONS

- .1 Do not pour concrete when rain or bad weather can damage it.
- .2 Place concrete while complying with the temperature limits in CAN/CSA-A23.1/A23.2.
- .3 Cold weather protection:
 - .1 Store on-site protective equipment ready for use.
 - .2 Use protective equipment when the air temperature drops below 5 degrees C or is forecast to drop below 5 degrees C in the 24 hours following the concreting.
 - .3 It is prohibited to pour concrete on a surface or against a surface when the temperature is below 5 ° C.
- .4 Hot weather protection:

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CAST-IN-PLACE CONCRETE

- .1 Protect concrete against direct sunlight when ambient temperature is above 27 ° C.
- .2 Prevent formwork temperature from mounting excessively before pouring concrete. Apply recognized methods to lower the formwork temperature without damaging the concrete.
- .3 Protect against drying.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Tome VII – Materials, Standard 3101, from collection Ouvrages routiers, Normes, du MTQ.

2.2 MATERIALS

- .1 Portland Cement: to CSA A3001, Type GU.
- .2 Blended hydraulic cement: Type GUb to CSA A3001.
- .3 Portland-limestone cement: Type GUL to CSA A23.1.
- .4 Supplementary cementing materials : selon la norme CAN/CSA A3001 et selon les exigences suivantes :
 - .1 Remplacement minimal de 15 % de cendres volantes selon la masse des matériaux cimentaires au total.
 - .2 Minimum de 5 % de fumées de silice.
 - .3 Remplacement maximal de 30 % selon la masse des matériaux cimentaires au total.
- .5 Water: to CSA A23.1.
- .6 Aggregates: to CSA A23.1/A23.2.
- .7 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .8 Shrinkage compensating grout: premixed compound consisting of metallic non-metallic aggregate, Portland cement, water reducing and plasticizing agents to CSA A23.1/A23.2.
 - .1 Compressive strength: 35 MPa at 28 days.
 - .2 Net shrinkage at 28 days: maximum 0.08 %.
- .9 Non premixed dry pack grout: composition of non metallic aggregate Portland cement with sufficient water for mixture to retain its shape when made into ball by hand and capable of developing compressive strength of 35 MPa at 28 days.

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- .10 Post-Tensioning Ducts: to CSA A23.1/A23.2.
- .11 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D1751.
- .12 Weep hole tubes: plastic.
- .13 Polyethylene film: 0.15 mm thickness to CAN/CGSB-51.34.
- .14 Steel reinforcement placement compliant to Section 03 20 00 – *Concrete reinforcing*.

2.3 MIXES

- .1 Performance Method for specifying concrete performance criteria to CSA A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .2 Provide concrete mix to meet following plastic state requirements:
 - .1 Workability: free of surface blemishes loss of mortar colour variations segregation.
 - .3 Provide concrete mix to meet following hard state requirements:
 - .1 Durability and class of exposure: C-1.
 - .2 Compressive strength at 28 days of age: 35 MPa minimum.
 - .3 Intended application : repair work and barriers.
 - .4 Aggregate size: 20 mm maximum.
 - .5 Pre-Qualification: air-entraining agent, slump, and temperature results based on the previous use of the proposed mixture.
 - .4 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .5 Certification du fournisseur de béton : la centrale de malaxage et les matériaux doivent satisfaire aux exigences de la norme CAN/CSA A23.1.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

- .1 Require a delivery slip for each concrete load from the concrete supplier and submit a copy of the slip to the Consultant after each pour. The following information should appear on the slip:
 - .1 Supplier name and address
 - .2 Truck Number
 - .3 Name of Contractor
 - .4 Designation and Location of the Project
 - .5 Concrete class
 - .6 Cumulative Quantity

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CAST-IN-PLACE CONCRETE

- .7 Beginning of unloading
- .8 End of unloading
- .9 Maximum aggregate size
- .10 Air Entrained Required
- .11 Types of Adjuvants Used
- .12 Quantity and type of cement
- .13 Water quantity.
- .2 Site tests (on field, in laboratory and/or in factory)
 - .1 Conduct tests as follows in accordance with Section 01 45 00 - *Quality Control* and submit report as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .1 Concrete batch;
 - .2 Slump;
 - .3 Air content;
 - .4 Compressive strength at 7 and 28 days.
 - .5 Air temperature and concrete temperature.
 - .6 Test registry
 - .2 The precontrol of the concrete shall be performed by the Contractor's laboratory to the satisfaction of the Consultant in accordance with CAN/CSA A23.1/A23.2.
 - .1 Ensure testing laboratory is certified to CAN/CSA A283.
 - .3 The testing laboratory will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
 - .4 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2. The testing shall be done by the Contractor's designated laboratory.

3.2 PREPARATION

- .1 Obtain Agency's Representative's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 Place concrete reinforcing in accordance with Section 03 20 00 - *Concrete Reinforcing*.
- .3 During concreting operations
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .4 Pumping of concrete will not be permitted is permitted only after approval of equipment and mix.
- .5 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .6 Prior to placing of concrete obtain Agency's Representative approval of proposed method for protection of concrete during placing and curing in adverse weather.

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- .7 Protect existing Work from staining.
- .8 Clean and remove stains prior to application for concrete finishes.
- .9 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
- .10 In locations where new concrete is dowelled to existing work, drill holes in existing concrete.
 - .1 Place steel dowels of deformed steel reinforcing bars and pack solidly with shrinkage compensating grout epoxy grout to anchor and hold dowels in positions as indicated.
- .11 Do not place load upon new concrete until authorized by Agency's Representative.
- .12 Immediately before placing concrete, properly water the substrate with clean water.

3.3 INSTALLATION/APPLICATION

- .1 Do cast-in-place concrete work to CSA A23.1/A23.2.
- .2 Sleeves and inserts
 - .1 Do not permit penetrations, sleeves, ducts, pipes or other openings to pass through joists, beams, column capitals or columns, except where indicated or approved by the Agency's Representative.
 - .2 Where approved by the Agency's Representative, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere.
 - .3 Sleeves and openings greater than 100 x 100 mm not indicated shall be reviewed by the Agency's Representative.
 - .4 If inserts cannot be located as specified, obtain written approval of modifications from the Agency's Representative before placing of concrete.
 - .5 The contractor shall provide position conflict possibility with cast in place elements during installation of rebars as bollards, rungs et all others elements cast in place.
 - .6 Confirm locations and sizes of sleeves and openings shown on drawings.
 - .7 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts
 - .1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
 - .2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from the Agency's Representative.
 - .1 Formed holes: 100 mm minimum diameter.
 - .2 The diameter of the drilled holes after the concrete has set shall comply with the manufacturer's recommendations.
 - .3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.

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- .4 Set bolts and fill holes with shrinkage compensating grout epoxy grout.
- .5 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Finishing and curing:
 - .1 Finish concrete to CSA A23.1/A23.2.
 - .2 Use procedures as reviewed by those noted in CSA A23.1/A23.2 to remove excess bleed water. Ensure surface not damaged.
 - .1 Use curing compounds compatible with applied finish on concrete surfaces.
- .5 Joint fillers:
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by the Agency's Representative.
 - .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Locate and form isolation construction expansion joints as indicated.
 - .4 Install joint filler.
- .6 Crack initiation
 - .1 Saw cut required by drawings shall be carried out as soon as feasible without loosening aggregates or causing spalling when the concrete has begun to harden, but before the stresses produced by shrinkage have caused irregular cracks.
 - .2 Saw cut shall be rectilinear. It shall not deviate by more than 6 mm over a length of 3 m. Immediately after sawing, the groove produced, and the surface of the concrete lining shall be cleaned of any sawdust or debris.
 - .3 Anticipate the preparation, supply and treatment of cracks in order to make an injection over an additional 30 meters for any type of cracks on the concrete. This Intervention Length does not include the repair of cracks greater than the value indicated in the tolerance section under the responsibility of the Contractor

3.4 SURFACE TOLERANCE

- .1 Concrete tolerance to CSA A23.1
- .2 Ensure surfaces are smooth, continuous and uniform. Ensure that the visible side of the wall (on Canal side) is free of cavities.
- .3 The formworks joints shall not be visible (the surface shall be smooth)
- .4 Cracks with a width greater than 0.8mm shall be repaired and injected according to activity 3106 - Crack Filling, of the Structures Maintenance Manual, Gouvernement du Québec, latest edition.

3.5 CAST-IN-PLACE CONCRETE CURING

- .1 The concrete cure installed shall be done so in accordance with the following requirements in addition to the curing requirements of CAN / CSA-A23.1 / A23.2.

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- .2 Cure of non-enclosed concrete surfaces: Absorbent water-absorbent cloth
 - .1 Install water-saturated synthetic fiber webs on sufficiently hardened concrete surfaces to prevent surface damage and then cover with impermeable sheets to maintain moisture on the surface of the concrete.
 - .2 Overlap each sheet by a minimum of 75 mm and secure against wind movement.
 - .3 Maintain absorbent webs in place and keep them moist so that there is a thin layer of water on the surface of the concrete throughout the cure, for a period of seven (7) calendar days thereafter concreting.
- .3 Concrete surface curing :
 - .1 No additional curing is required if the formwork is left in place for seven (7) consecutive days or more.
 - .2 If the formwork is removed within seven (7) consecutive days, wetted water-absorbent cloths or membrane curing materials shall be applied immediately to the stripped surfaces and maintained for a seven (7) consecutive day period in accordance with Section 03 10 00 - *Concrete Form and Accessories*.
- .4 During the curing period, only the areas requiring finishing treatment can be uncovered. All other surfaces shall remain covered.

3.6 COLD WEATHER PROTECTION

- .1 Concrete work in Tome VII (MTQ), Chapter 3 “Bétons et produits connexes” may be carried out in cold weather and may require shelter, heating, or thermal insulation.
- .2 The temperature of the plastic concrete at the time of installation shall comply with the requirements of Standard 3101 of the Ministère des Transports du Québec as set out in Annex 1, (Tome VII, MTQ), chapter 3, section 3.1 Concrete, Standard 3101, *normal density concrete*.
- .3 Assume the heating of the shelter to comply with the requirements of this section and with the requirements of CSA Standard A23.1 / A23.2, Constituents and performance of work/test methods and standardized practices for concrete, relative to the temperatures of the materials adjacent to the repairs during the concreting, to the constituents of the concrete and to the temperature during curing.
- .4 Maintain a minimum temperature of 10 ° C on concrete surfaces for a minimum of seven (7) consecutive days following concreting.
 - .1 Extend protection period until concrete reaches 70% of required compressive strength at twenty-eight (28) days.
- .5 After the protection period, lower the concrete temperature gradually for the first twenty-four (24) hours.
 - .1 The rate of decrease in temperature shall not exceed 10 ° C / hour.
 - .2 Do not allow concrete to encounter exterior air if the temperature if the difference between the concrete and the outside air is greater than 20 ° C.
- .6 Concrete curing requirements apply regardless of the type of protection installed.

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- .7 Any concrete that has frozen is not paid and is rejected. The part of the structure constructed with this concrete is deemed to be defective and shall be reconstructed per the plans and specifications at the Contractor's cost.
- .8 Existing concrete, frames and formwork
 - .1 The use of sodium chloride or calcium chloride as a de-icing agent is prohibited.
 - .2 In the case of open air concreting, all surfaces (existing concrete, reinforcement, formwork, etc.) with which the plastic concrete comes into contact shall be pre-heated to a minimum temperature of 5 ° C until concreting.
- .9 In the case of concreting under cover, heat and maintain the contact surfaces at a temperature between 5 ° C and 20 ° C for a period of at least 24 hours prior to concreting.
- .10 Keep formwork in place for the entire duration of protection and maintain enclosed areas at a temperature of 5 ° C and 20 ° C for the duration of the protection.
- .11 Types of protection
 - .1 Insulation
 - .1 Use an insulating material to cover the surface of plastic concrete.
 - .1 Each layer of insulating material shall be of the waterproof cover type made from a closed cell foam plate and have an RSI thermal resistance of 0.40.
 - .2 On the day before concreting, have the Agency's Representative approve the number of layers of insulating material to be laid.
 - .1 Depending on the temperature of the concrete during the protection period, the Agency's Representative may require to reduce or increase the number of layers; the removal or addition of a layer shall be completed within three (3) hours following the Agency's Representative's request.
 - .3 Ensure insulation is installed in such a way that it prevents exposure of concrete surfaces to outside air throughout the duration of protection.
 - .4 Seams of insulating covers shall have an overlap of at least 75 mm.
 - .2 Temporary Shelters
 - .1 Build protective shelters to enclose structures.
 - .2 Prepare and submit the plan for the construction of the protective shelter at least two (2) weeks prior to commencing concreting under these shelters.
 - .3 Make the shelter to cover the surfaces of the work to be concreted with canvas and tarpaulins.
 - .1 These covers shall be leakproof, resistant and secured so as not to be moved during the period of protection.
 - .4 Ensure that the shelter is of sufficient height and size to allow indoor placement, concrete placement (cast or cast), concrete finish and curing.

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CAST-IN-PLACE CONCRETE

3.7 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.
 - .1 Keep the area clean at the end of each workday.
- .2 Final cleaning: Evacuate surplus materials / materials, waste, tools, and equipment from the site in accordance to section 01 74 00 – *Cleaning*.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 19 - *Waste Management and Disposal*.
 - .1 Prepare a Waste Reduction Workplan (WRW) according to Section 01 74 19 – *Waste Management and Disposal*.
 - .2 Divert unused concrete materials from landfill to local quarry facility after receipt of written approval from the Agency’s Representative.
 - .3 Remove bins and recycling trolleys from site and dispose of materials at appropriate facilities.
 - .4 Provide appropriate area on job site where concrete trucks and be safely washed.
 - .5 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by the Agency’s Representative.
 - .6 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
 - .7 Prevent admixtures and additive materials from entering drinking water supplies or streams.
 - .8 Using appropriate safety precautions, collect liquid, or solidify liquid with inert, non-combustible material and remove for disposal.
 - .9 Dispose of waste in accordance with applicable local, Provincial/Territorial, and National regulations.

END OF SECTION

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HISTORIC - MASONRY REPOINTING

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 08 – Historic – Mortaring.
- .2 Section 04 03 09 – Historic – Grouting.
- .3 Section 04 03 42 – Historic – Replacing of stone.
- .4 Section 04 05 00 – Common work results for masonry.

1.2 REFERENCES

- .1 Definitions:
 - .1 Raking: removal of loose/deteriorated mortar to a depth suitable for repointing until sound mortar, and/or at least 40 mm and/or not more than 100 mm depth is reached.
 - .2 Repointing: filling and finishing of masonry joints from which mortar is missing, has been raked out or has been omitted.
 - .3 Tooling: finishing of masonry joints using tool to provide final contour.
 - .4 Low-pressure water cleaning: water soaking of masonry using less than 350 kPa (50 psi) water pressure, measured at nozzle tip of hose.
- .2 Reference Standards:
 - .1 CSA Group
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-04(R2014), Mortar and Grout for Unit Masonry.

1.3 QUALITY ASSURANCE

- .1 Masonry Contractor:
 - .1 Call upon only one Masonry Contractor for masonry work at and.
 - .2 Masonry Contractor will to be capable of demonstrating his skills and will present three (3) realizations in historic stone masonry work on project of similar size and complexity to Work of this contract during the last 10 years.
 - .3 Masonry Contractor to have good level of understanding of structural behaviour of masonry walls when masonry work involves replacing or repairing stonework which are part of structural masonry work.
- .2 Masons:
 - .1 Masons to have certificate of qualification with five (5) years minimum experience in historic stone masonry work.
 - .2 Masons to have proof of license certification for proprietary restoration mortars.

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HISTORIC - MASONRY REPOINTING

- .3 Mock-ups:
 - .1 Construct two (2) work samples 1,5 m x 1,5 m where indicated by the Agency's Representative to demonstrate raking and repointing procedures.
 - .2 Provide Agency's Representative with at least 24 hours notice prior to construction of the mock-ups.
 - .3 Make samples of the work under the supervision of the Agency's Representative so as to demonstrate, before the beginning of the work, that the prescribed processes, techniques and dosages are well understood.
 - .4 Allow 24 hours for inspection of mock-up by Agency's Representative before proceeding with masonry repointing work.
 - .5 Accepted mock-up will demonstrate minimum standard for this work.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Keep material dry. Protect from weather, freezing and contamination.
- .3 Ensure that manufacturer's labels and seals are intact upon delivery.
- .4 Remove rejected or contaminated material from site.

1.5 AMBIENT CONDITIONS

- .1 Maintain masonry temperature between 10 and 27 °C for duration of work.
- .2 Ambient temperature lower than 10°C: Store mortaring materials for immediate use within heated enclosure in accordance with section 04 03 08 – Historic – Mortaring and allow them to reach minimum temperature of 10 °C before use.
- .3 Only water can be heated before use. Provide hot water to a maximum 40 °C on site during cold weather.
- .4 Maintain mortar mix temperature between 5 and 40 °C.

Part 2 Products

2.1 MORTAR

- .1 Mortar: in accordance with CAN/CSA-A179 and Section 04 03 08 - Historic - Mortaring.

Part 3 Execution

3.1 RAKING JOINTS

- .1 Use manual raking tool to remove deteriorated and bonded mortar from masonry units. The use of saw is strictly prohibited.

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HISTORIC - MASONRY REPOINTING

- .1 Remove deteriorated and adhered mortar from masonry surfaces to sound mortar maximum depth of 100 mm, leaving square corners and flat surface at back of cut.
- .2 Clean out voids and cavities encountered.
- .2 Ensure that no stones and other masonry units are chipped, altered or damaged by work to remove mortar in joints.
- .3 Clean surfaces of joints by compressed air or water under low pressure without damaging texture of exposed joints or masonry units.
- .4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.
- .5 Leave no standing water.

3.2 REPOINTING

- .1 Dampen joints as well as masonry units.
- .2 Keep masonry damp while pointing is being performed.
- .3 Completely fill joint with mortar. Use type "N" mortar.
 - .1 If surface of masonry units has worn rounded edges keep pointing back from surface to keep same width of joint
 - .2 Avoid feathered edges.
 - .3 Pack mortar firmly into voids and joints.
- .4 Build-up pointing in layers not exceeding 25 mm in depth.
 - .1 Allow each layer to set before applying subsequent layers.
 - .2 Maintain joint width to full depth.
- .5 Tool and finish joints to match existing joints or as directed by Agency's Representative.
- .6 Remove excess mortar from masonry face before it sets.

3.3 PROTECTION DURING CURING PROCESS

- .1 Cover completed and partially completed work not enclosed or sheltered at end of each work day. Membranes be tightly installed to prevent finished work from drying out too rapidly.
- .2 Cover with waterproof tarps to prevent weather from eroding recently repointed material.
 - .1 Maintain tarps in place for minimum of 2 weeks after repointing.
 - .2 Ensure that bottoms of tarps permit airflow.
- .3 Anchor coverings securely in position.
- .4 Damp cure:
 - .1 Provide damp cure for pointing mortars.

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HISTORIC - MASONRY REPOINTING

- .2 Install and maintain wetted burlap protection during the curing process and over minimum three (3) days.
- .3 Wet mist burlap only - ensure no direct spray reaches surface of curing mortar.
- .4 Shade areas of work from direct sunlight and maintain constant dampness of burlap.
- .5 Protect from drying winds. Pay particular attention at corners of structure.
- .6 Maintain ambient temperature of minimum 10 °C after repointing masonry for:
 - .1 Minimum 3 days in summer.
 - .2 Minimum 30 days in cold weather conditions using dry heated enclosures.

3.4 CLEANING

- .1 Clean surfaces thoroughly of mortar droppings, stains and other blemishes resulting from work of this contract on a daily basis, as work progresses.
- .2 Remove droppings and splashings using clean sponge and water.
- .3 Do further cleaning using stiff natural bristle brushes after mortar has attained its initial set and has not fully cured.
- .4 Clean masonry with stiff natural bristle brushes and plain water and soft natural bristle brush
- .5 Clean masonry with low pressure 15 to 45 lb/ps² clean water and soft natural bristle brush.

3.5 PROTECTION OF COMPLETED WORK

- .1 Protect adjacent finished work against damage which may be caused by on-going work.

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HISTORIC - MORTARING

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 – Historic – Masonry repointing.
- .2 Section 04 03 09 – Historic – Grouting.
- .3 Section 04 03 42 – Historic – Replacing of stone.
- .4 Section 04 05 00 – Common work results for masonry

1.2 ALTERNATES

- .1 Obtain Agency's Representative's approval before changing manufacturer's brands or sources of supply of mortar materials during entire contract or other methods of mixing mortar specified elsewhere in this specification.

1.3 REFERENCES

- .1 CSA International
 - .1 CAN/CSA-A179-04(R2009), Mortar and Grout for Unit Masonry.

1.4 TECHNICAL DATA SHEET

- .1 Submit technical data sheets of products used at least fifteen (15) days prior to commencing work.

1.5 TESTING STANDARDS

- .1 Flow and cube strength: to ASMT C 270.
- .2 Vicat cone test: to ASTM C780.
- .3 Cube strength: to CAN/CSA-A179, annexe B.
- .4 Flexural bond strength: to ASTM C1072.

1.6 AMBIENT CONDITIONS

- .1 Execute work when ambient temperature is above 10 °C. When ambient temperature is below 10 °C, cover and heat work as directed by Agency's Representative.
- .2 Prepare and maintain temperature of mortar between 5 and 40 °C until used.
- .3 Maintain the temperature of receiving surface and mortar between 10 and 25 °C for 72 hours after application in summer and for 30 days in winter.

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HISTORIC - MORTARING

Part 2 Products

2.1 MORTAR

- .1 Type S joint and bedding mortar: based on proportion specifications, consisting of 2 parts grey Portland cement, one (1) part lime, and nine (9) parts sand.
- .2 All dry mortar materials shall be premixed at the plant, bagged and originate from one (1) only manufacturer.

2.2 COMPRESSIF STRENGTH

- .1 Compressive strength measured on collected samples shall comply with the following:
 - .1 Type S mortar:
 - .1 compressive strength 5 MPa at 7 days
 - .2 compressive strength 8,5 MPa at 28 days

2.3 AIR CONTENT

- .1 Type S mortar: 18 % maximum.

Part 3 Execution

3.1 LIME MORTAR BATCHING

- .1 Mix mortar in a clean mortar mixer. Use potable water in quantities recommended by the manufacturer and mix as indicated.

3.2 CLEANING

- .1 Remove droppings and splashings using clean sponge and water.
- .2 Clean masonry with low pressure 15 to 45 psi clean water and soft natural bristle brush.

END OF SECTION

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HISTORIC - GROUTING

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 – Historic – Masonry repointing.
- .2 Section 04 03 08 – Historic – Mortaring.
- .3 Section 04 03 42 – Historic – Replacing of stone.
- .4 Section 04 05 00 – Common work results for masonry.

1.2 REFERENCES

- .1 Definitions:
 - .1 Grout: cementitious or epoxy mixture of liquid consistency suitable for pouring or pumping, to fill voids between masonry elements.
- .2 Reference Standards:
 - .1 CSA Group
 - .1 CSA A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179, Mortar and Grout for Unit Masonry.
 - .3 CSA-A3000, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Work method:
 - .1 Submit a document describing method of wall's grout injection, including the position of injection pipes, equipment required and the sequence of works.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Keep material dry. Protect from weather, freezing and all forms of contamination.

1.5 AMBIENT CONDITIONS

- .1 Maintain temperature of masonry elements to be grouted above 5 °C throughout their thickness, during and 48 hours after grouting.

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HISTORIC - GROUTING

Part 2 Products

2.1 MATERIALS

- .1 Pre-packaged: « SikaGrout 300PT » Sika (22,7Kg) or equivalent approved by Agency's Representative.
- .2 Water: clean and free from contaminants and organic material in accordance to CSA A23.1/A23.2.

2.2 EQUIPMENT

- .1 According to the recommendations of the technical datasheet concerned.
- .2 Maintain mixing equipment in good working order. Ensure that necessary spare parts are available on site.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grout installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Agency's Representative.
 - .2 Report to Agency's Representative before start of work possible structural masonry problems and conditions that do not conform to those specified including existing voids or possible openings which risk being compromised when grout will flow.
 - .3 Inform Agency's Representative of unacceptable conditions immediately upon discovery.
 - .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Agency's Representative.

3.2 INSPECTION

- .1 Mixing operations: continuously inspected by Agency's Representative.
- .2 Provide required assistance to facilitate taking of grout samples and inspection work.
- .3 Inspect surfaces of structure before commencing injection work.

3.3 CONDITION OF SURFACES

- .1 Evaluate moisture content of masonry work by taping 3 x 3 m polyethylene sheet to masonry surface. If moisture collects on underside of sheet before epoxy would cure, allow masonry work to dry sufficiently before commencing injection work.

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HISTORIC - GROUTING

3.4 MEASUREMENT AND MIXING

- .1 Make volume measurement using suitably gauged hopper of size compatible with volume of grout prepared.
- .2 Keep volume measures clean and free from crusting.
- .3 Use manufacturer's mass density information in making mass measurement to proportion mortar grout.
- .4 Mix cementitious materials, mix the admixtures and bag mix in the mixing water according to the manufacturer's specifications.
- .5 Use grout before it has begun to set but not more than 45 minutes after initial mixing.

3.5 FIELD LOG

- .1 Maintain log of grouting work. Containing collection of information, including:
 - .1 Course of pumping data including calibration of equipment used.
 - .2 Grout components (products, additions, admixtures and water) and quantity pumped.
 - .3 Pumping mode.
 - .4 Injection site.
 - .5 Pumping pressure at injection sites.
 - .6 Readings of pressure and flow injection taken, either by data loggers or manually.
 - .7 Equipment used.
 - .8 Staff on site.
 - .9 Drilling Plan.

3.6 PREPARATION

- .1 Ensure that all repointing work is done before starting grouting works.
- .2 Wet surfaces, deep into substrate.

3.7 INSTALLATION

- .1 Insert injection tubes with a regular spacing during repointing works in according to the method presented to Agency's Representative for approval at least 10 days prior the commencement of work.
- .2 Start the grout injection at the bottom.
- .3 Seal leaks with quick-setting cement.

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HISTORIC - GROUTING

3.8 CLEANING

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

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HISTORIC - REPLACING STONE

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 – Historic – Masonry repointing.
- .2 Section 04 03 08 – Historic – Mortaring.
- .3 Section 04 03 09 – Historic – Grouting.
- .4 Section 04 05 00 – Common work results for masonry.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM C97/C97M, Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
 - .2 ASTM C170/C170M, Standard Test Method for Compressive Strength of Dimension Stone.
 - .3 ASTM C568/C568M, Standard Specification for Limestone Dimension Stone.
 - .4 ASTM C616/C616M, Standard Specification for Quartz-Based Dimension Stone.
- .2 CSA Group
 - .1 CAN/CSA-A179, Mortar and Grout for Unit Masonry.
 - .2 CSA A370, Connectors for Masonry.
 - .3 CAN/CSA-A371, Masonry Construction for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Shop Drawings:
 - .1 Submit drawings describing method of stone replacement, including removal, shoring and erection.
 - .2 Submit drawings stamped and signed by professional engineer with experience in rehabilitating historic structures registered or licensed in Quebec.
 - .3 Keep in mind that no technical document in DWG format will be provided to contractor and/or subcontractor.
- .2 Drawings of stone cutting:
 - .1 Submit a drawing for each type of stone being replaced showing dimensions, type finish on exposed and unexposed faces, bedding planes, location of anchors and other details.
 - .2 Submit drawings along with samples.
- .3 Samples:

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HISTORIC - REPLACING STONE

- .1 Submit samples of replacement stones not less than fifteen (15) days before masonry work begins.
 - .1 Submit two (2) of each type of masonry unit specified: facing stone, coping stone.
 - .2 Samples shall have the following dimensions: 300 mm x 300 mm x 300 mm.

1.4 QUALITY ASSURANCE

- .1 The Masonry Contractor must have the skills and experience required to perform the work in accordance with the plans and specifications.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials to avoid altering or staining their finish.
- .2 Keep materials dry. Protect against weather, freezing and any source of contamination.
- .3 Do not place stones directly on the ground.

1.6 LIST OF STONE

- .1 Make a list of each of the stones to be replaced, indicating their accurate dimensions, their location in the structure and a reference to the stone cutting drawings submitted.

Part 2 Products

2.1 MATERIALS

- .1 New stones shall come from a single stone quarry, which shall be accepted by the Agency's Representative.
 - .1 Ensure that the supply quarry can provide materials of uniform quality and characteristics corresponding to existing materials.
 - .2 Stone supply should respect approved schedule.

2.2 STONE PROPERTIES

- .1 General description
 - .1 Stone should come from uniform and compact structural layers. Extraction bed thickness shall allow saw cutting and straightening of exposed faces (bush hammering and combing).
 - .2 Stone should come from deep layers and not surface layers; the color should be from grey to dark grey and should harmonized with existing stone color; they shall not contain quartz and other impurities.
- .2 Technical description :
 - .1 Geological age: Chazy's formation.

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HISTORIC - REPLACING STONE

- .2 Chemical classification : first quality magnesian type with lest than 20% impurities.
- .3 Mechanical resistance :
 - .1 Compressive strength : 35 Mpa in perpendicular direction to natural bed stone.
 - .2 Absorption : 0,09%

2.3 STONE BEDDING PLANES

- .1 All types of stone with horizontal bedding plane.

2.4 STONE FABRICATION

- .1 Stones to be perfectly squared to shape and dimensions to existing dimensions.
 - .1 Dress exposed faces true. Finish exposed faces of stones to match finish of existing stones.
 - .2 The five (5) unexposed faces of the stones shall be roughened after sawing and display perfectly rough surfaces offering good adherence with mortar to full depth of stones. No sawed surface will be accepted.
- .2 Execute profiled work from full size details and templates. Make exposed arises in true alignment and ease slightly to prevent snipping.
- .3 Drill stones in stone to fit lifting hooks.
 - .1 Provide Lewis pin and clamp holes in pieces which cannot be manually lifted.
 - .2 Do not cut holes in exposed surfaces and at least than 150 mm from a rise.
- .4 Finish exposed faces and edges of stones to comply with requirements indicated for finish and match approved samples and field-constructed mock-up.

2.5 FABRICATION TOLERANCES

- .1 Fabricate limestone dimension stone to the following tolerances:
 - .1 Unit Length: plus or minus 3 mm.
 - .2 Unit Height: plus or minus 3 mm.
 - .3 Deviation From Square: plus or minus 3 mm, with measurement taken using the longest edge as the base.

2.6 EXISTING STONE

- .1 Existing stone salvage on site may not be used for replacement of smaller stones.

2.7 REJECTS

- .1 Stone from blasted quarry bed will be refused.
- .2 Stone from naturally fractured beds will be refused.

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HISTORIC - REPLACING STONE

- .3 After cutting and dressing, stone units shall display none of the following imperfections:
 - .1 Chipping and pick marks;
 - .2 Crack, fracture and traces of stone splitting;
- .4 The Contractor shall control the quality of the stones delivered to the construction site and the Consultant reserves the right to reject stones that do not meet the quality criteria set out for this project.

2.8 MORTAR

- .1 Mortar: in accordance with Section 04 03 08 - Historic - Mortaring.

Part 3 Execution

3.1 PREPARATION

- .1 Move and lift stone units using means to prevent damage. Submit stone units dropped or impacted to Consultant for inspection and approval.
- .2 Indicate bedding planes of stone units. Duplicate bedding marks on usable pieces of cut stone.

3.2 STONE REMOVAL

- .1 Stone removal in accordance with the stone's replacement method prepared by the Contractor's mandated engineer.
- .2 Remove dust, loose fragment and mortar from slot.

3.3 RAKING JOINTS

- .1 Rake joints around stones to be removed in accordance with section 04 03 07 Historic - Masonry Repointing.

3.4 MOVING STONES

- .1 Use Lewises or dogs to lift stones to working level.
- .2 Slide stones into place on wood ramps.
- .3 Protect edges of stone from damage when hoisting and lifting from position. Use separators or wood shims to isolate units from hoisting belts. Incorporate only undamaged stone in Work.

3.5 STONE REPLACEMENT

- .1 Install masonry stainless steel ties, connectors and flashings in accordance with drawings. Prior to placing mortar, obtain approval of Agency's Representative of placement of ties and connectors.
- .2 Co-ordinate bond pattern, coursing height and joint width with existing masonry work.

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HISTORIC - REPLACING STONE

- .3 Clean dust and stone fragments from slot where new veneer stone will be inserted. Before proceeding with Work, inspect cleaned surface with Consultant.
- .4 Dampen stone slot's surfaces before applying mortar.
- .5 Apply bedding mortar.
 - .1 Lay stones on full beds of mortar.
 - .2 Fill vertical joints buttered and placed full in face, and at vertical joint between wythes.
 - .3 Lay stones and tool joints in one operation, tooling with a round jointer to provide smooth joints compressed uniformly concave.
 - .4 Rake bedding mortar back to a minimum depth of 25 mm and make ready for pointing with pointing mortar. Provide minimum 3-day damp cure to bedding mortar prior to pointing.
- .6 Lay heavy stones and projecting stones after mortar in courses below has hardened sufficiently to support weight.
- .7 Prop and anchor projecting stones until wall above is set.
- .8 Set stones to match alignment of adjacent stones or plumb, true and level in full bed of mortar with vertical joints buttered and placed full. Completely fill anchor, dowel and lifting holes and voids left by removed edges.
- .9 Apply pointing mortar. Fill raked joints with pointing mortar.
- .10 Finish joints identical to existing.
- .11 Keep fresh mortar damp for three (3) days and minimum temperature of 10 °C. Refer to section 04 03 07 - Historic - Masonry Repointing.
- .12 Clean masonry as work progresses.
 - .1 Remove mortar dropping from face of stone.
 - .2 Clear face of veneer masonry of any trace of mortar.
 - .3 Remove mortar residue from face of stone before mortar is set.
 - .4 Use only clean water and soft natural bristle brush to clean masonry.
- .13 Inspect finished work with Agency's Representative.

3.6 FILLING JOINTS/POINTING

- .1 Fill joints and point: in accordance with Section 04 03 07 - Historic - Masonry Repointing.

3.7 CLEANING

- .1 Confirm acceptance of mock-up cleaning operations to demonstration from Agency's Representative before starting cleaning work.
- .2 Clean stone work surfaces after repairs have been completed and mortar has set.

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HISTORIC - REPLACING STONE

- .3 Clean stone surfaces of adhesive or mortar residue resulting from work performed without damaging stone or joints.
- .4 At work completion, clear site of debris, surplus material and equipment, leaving work area in clean and safe condition.

END OF SECTION

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COMMON WORK RESULTS FOR MASONRY

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 04 03 07 – Historic – Masonry repointing.
- .2 Section 04 03 08 – Historic – Mortaring.
- .3 Section 04 03 09 – Historic – Grouting.
- .4 Section 04 03 42 – Historic – Replacing of stone.

1.2 REFERENCES

- .1 CSA Group
 - .1 CAN/CSA-A371, Masonry Construction for Buildings.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec, Canada.
- .3 Samples:
 - .1 Provide samples required in accordance with section 01 33 00 – Submittal Procedures.
- .4 Installer Instructions
 - .1 Provide manufacturer's installation instructions, including storage, handling, safety and cleaning.

1.4 QUALITY ASSURANCE

- .1 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Mock-up used:
 - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
 - .3 Construct mock-up where directed by the Agency's Representative.
 - .4 Allow 24 hours for inspection of mock-up by Agency's Representative before proceeding with work.

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COMMON WORK RESULTS FOR MASONRY

- .5 When accepted by the Agency's Representative, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
- .6 Start work only upon receipt acceptance of mock-up by Agency's Representative.
- .7 Masonry contractor will have to be capable of demonstrating his skills and will present three (3) realizations in historic stone masonry work on projects of similar size and complexity to Work of this Contract during the last 10 years.
- .8 Execute work of this section by personnel experienced in preservation of historic masonry.
- .9 Masons engaged by Masonry Contractor to have minimum of five (5) years' experience with historic masonry.
- .10 All Masons engaged on this project shall demonstrate their skills to reproduce the mock-up.
- .11 All Masons engaged during this project should meet the requirements above. When Masons leave the project, all alternative masons should meet the requirements too.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Keep materials dry. Protect against weather, freezing and any source of contamination.
- .4 Remove rejected or contaminated material from site.

1.6 SITE CONDITIONS

- .1 Ambient Conditions
 - .1 Assemble and erect components when temperatures are above 10 degrees C.
- .2 Cold weather requirements:
 - .1 To CAN/CSA-A371 with following requirements.
 - .1 Maintain temperature of mortar between 5 degrees C and 40 degrees C until batch is used or becomes stable.
 - .2 Maintain ambient temperature of masonry work and it's constituent materials between 10 degrees C and 27 degrees C and protect site from windchill.
 - .3 Maintain temperature of masonry above 10 degrees C for minimum of 30 days, after mortar is installed.
 - .4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.
- .3 Hot weather requirements:

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COMMON WORK RESULTS FOR MASONRY

- .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
- .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
- .4 Spray mortar surface at intervals and keep moist for maximum of 3 days after installation.
- .5 Monitor and verify temperature daily on site to meet the specific requirements for temperature and humidity for work execution.

1.7 WARRANTY

- .1 For Work in this Section 04 05 00 - Common Work Results for Masonry, 12 months warranty period is extended to 60 months.

Part 2 Products

2.1 MATERIALS

- .1 Masonry materials are prescribed in sections mentioned in section Related Requirements.
- .2 Mortaring: in accordance with CAN/CSA-A179 and with Section 04 03 08 Historic – Mortaring.

Part 3 Execution

3.1 PREPARATION

- .1 Protect adjacent materials from damage and deterioration.

3.2 INSTALLATION-GENERAL

- .1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.

3.3 CONSTRUCTION

- .1 Jointing: Section 04 03 07 – Historic – Masonry Repointing.
- .2 Replacing stone: Section 04 03 42 – Historic – Replacing stone.

3.4 SITE TOLERANCES

- .1 Tolerances in notes to CAN/CSA-A371 apply.

3.5 CLEANING

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

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COMMON WORK RESULTS FOR MASONRY

3.6 PROTECTION

- .1 Protect adjacent finished work against damage which may be caused by on-going work.

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METAL FABRICATIONS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 *Lead - Based Paint Abatement - Maximum Precautions*
- .2 Section 06 10 53 *Miscellaneous Rough Carpentry*
- .3 Section 09 91 13.23 *Exterior Painting of Structural Steel*

1.2 REFERENCE STANDARDS

- .1 American Association for State Highway and Transportation Officials (AASHTO)
 - .1 AASHTO, *Standard Specifications for Highway Bridges*, latest edition
- .2 ASTM International
 - .1 ASTM A325M, last edition, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength.
 - .2 ASTM A490M, last edition, Standard Specification for High-Strength Steel Bolts, Classes 10.9 and 10.9.3, for Structural Steel Joints.
- .3 CSA Group
 - .1 CSA G40.20/G40.21 latest edition, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164 latest edition, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S6 Canadian Highway Bridge Design Code, latest edition
 - .4 CSA S16 latest edition, Design of Steel Structures.
 - .5 CSA S269, latest edition, Falsework for Construction Purposes.
 - .6 CSA W48 latest edition, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .7 CSA W59 latest edition, Welded Steel Construction (Metal Arc Welding)
- .4 Ministère des Transports du Québec
 - .1 General Specifications and Specifications - Road Infrastructure - Construction and Repair *Cahier des charges et devis généraux – Infrastructures routières – Construction et réparation* (CCDG), latest edition.
 - .2 Tome VII – Materials, Standard 6101 Construction steel, *Acier de construction*, latest edition.
 - .3 Tome VII – - Materials, Standard 6201, Bolts, anchor rods, nuts and washers., *Boulons, tiges d'ancrage, écrous et rondelles d'acier*, latest edition.
 - .4 Tome VII – Materials, Standard 10104, Paint systems for steel structures, *Systèmes de peintures pour structures d'acier*, latest edition.

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METAL FABRICATIONS

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - *Submittal Procedures*.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for sections, pipe, bolts, tubing, plates and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - *Health and Safety Requirements* and 01 35 43 - *Environmental Procedures*.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Quebec by the *Ordre des ingénieurs du Québec (OIQ)*.
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.4 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Section 01 61 00 - *Common Product Requirements*.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location, off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse of crates, padding, packaging materials, pallets, in accordance with Section 01 74 19 - *Waste Management and Disposal*.

Part 2 Products

2.1 MATERIALS

- .1 Unless otherwise specified, the materials shall be conform to the following:
 - .1 Steel profiles and plates: 300W according to CSA G40.20 / G40.21.
 - .2 Welding materials: conform to CSA W59.
 - .3 Welding Electrodes: Compliant with CSA W48 Series.

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METAL FABRICATIONS

- .4 Bolts and anchor bolts: to ASTM A307
- .5 High strength nuts, washers and bolts: ASTM A325M. Bolts compliant with ASTM A490 shall be use, subject to the approval of the Consultant.

2.2 METAL FABRICATION - GENERAL

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Where possible, fit and shop assemble work, ready for erection.
- .3 Exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

- .1 Galvanizing: hot dipped galvanizing with zinc coating 610 g/m² to CAN/CSA-G164, except as noted below.
 - .1 For bolts, nuts and threaded rods, hot dip galvanizing with a zinc coating of 460 g/m² as per CAN/CSA-G164.
 - .1 Treat galvanized surfaces such that threads are not damaged when galvanized elements are connected.
 - .2 In order not to impair adhesion of paint, new galvanized steel elements that are to receive a paint coating shall not be treated with Chromate.
 - .2 Painting: Section 09 91 13.23 – *Exterior Painting of Structural Steel*.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of the Agency's Representative.
 - .2 Inform the Agency's Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions remedied [and after receipt of written approval to proceed from the Agency's Representative.

3.2 ERECTION - GENERAL

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to the Agency's Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.

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METAL FABRICATIONS

- .4 Exposed epoxy fastening devices to match finish and be compatible with material through which they pass.
- .5 Permanent or temporary welding is not allowed on a metal part of the structure if this weld is not indicated on the contractual drawings.
- .6 Assemble items on site.
- .7 Deliver templates and parts to be embedded in concrete and recess into masonry in the appropriate location.
- .8 Once assembly is complete, prime with rivets, spot welds, bolts and burned or scuffed surfaces, see section 09 91 13.23 – *Exterior Painting of Structural Steel*.
- .9 Using a zinc-rich primer, with a minimal content of 87% of metallic zinc in the dry film, , touch up galvanized surfaces at locations where damages were done during field works. Prior to applying zinc-rich primer, damaged surfaces shall be prepared and cleaned to SSPC-SP11. The zinc-rich coating shall have a minimal total dry film thickness of 130 µm.

3.3 CLEANING

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

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 10 53 *Miscellaneous Rough Carpentry*

1.2 REFERENCE STANDARDS

- .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 CSA Group
- .1 CSA O80 Serie 15, Wood Preservation.
 - .2 CSA O80.201, in terms of organic solvents for preparing solutions of preservatives.
 - .3 It is the Supplier's responsibility to refer to all codes and standards concerned for the supply of materials. Supplier must comply with the latest edition and revision of all documents of the American Society for Testing and Materials International (ASTM), the Canadian Standards Association (CSA) and other product-related standards.
 - .4 All wood should be treated and shaped according to the guidelines BMP - Best Management practices for the use of Treated wood in aquatic environments and sensitive.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit Submittal submissions: in accordance with Section 01 33 00- Submittal Procedures.
- .1 Sustainable Submittals:
 - .1 Submit certificate issued by Canadian Wood Preservation Authority (CWPCA) certifying conformity with Environment Canada Technical Recommendation Document for the Design and Operation of Wood Preservation Facilities.
 - .2 For products treated with preservative 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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- .3 Acceptable types of paint, stain, clear finishes and sealers that may be used over treated materials to be finished after treatment.
- .4 Product recommendation for field treatment for drillings and cuts authorized in the contract drawings.

1.4 QUALITY ASSURANCE

- .1 Each piece of wood to be identified by CSA O322 certified stamp.
- .2 Factory inspection of materials impregnated under pressure with a preservative should be in accordance with AWWA M2 and changes outlined in the standards of the CSA O80 series, under the heading "Additional requirements for standard AWWA M2"
- .3 As required by CSA O80, wood treated with CCA should be tested to chromotropic acid ensuring that the product is secure. This test must be performed according AWWA A3 and additional requirements specified in CSA O80 standard.
- .4 Factory inspection of the wood treatment must be done by a third party at the expense of the Contractor or the processing plant.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 06 10 53 Miscellaneous Rough Carpentry and Section 01 61 00 Common Product Requirements, with AWWA M4 with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with product category, manufacturer's name and address.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse/recycling in accordance with Section 01 74 19- Waste Management and Disposal.

Part 2 Products

2.1 SUSTAINABLE REQUIREMENTS

- .1 Wood preservation plants: certified by Canadian Wood Preservation Authority (CWPCA) to Environment Canada Technical Recommendation Document for the Design and Operation of Wood Preservation Facilities.

2.2 PRESERVATIVE TREATED WOOD MATERIALS AND APPLICATION

- .1 New wooden parts for lock gates, excluding covers over door rack opening trenches, shall be treated as follows:
 - .1 Wood must be treated with Chromated Copper Arsenate (ACC) in accordance with CSA O80 to achieve net retention for use in the marine environment (24 kg / m³ ACC) ie class of employment "CE5A".
 - .2 Other new pieces of wood for covers of door opening rack trenches on the banks of the lock shall be processed as follows:

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- .1 Wood must be treated with Quaternary Chromate Copper Arsenate (ACAQC) in accordance with the CSA O80 standard to achieve the net retention corresponding to the "CE4.1" class of use. Treatment with copper arsenate (CA) or copper naphthenate (NCU) are accepted as an alternative to treatment CAQ while maintaining employment class "CE4.1."

Part 3 Execution

3.1 CONSTRUCTION

- .1 On site, incorporate treated wood products according to article 3.3 – *FIELD TREATMENT* below and in accordance with Section 06 10 53 *Miscellaneous Rough Carpentry*.

3.2 PLANT TREATMENT

- .1 Work must be carried out by a specialized contractor recognized by the Canadian Wood Preservation Certification Authority.
- .2 Carry out work in accordance with AWP A M4 and the changes in the CSA O80 series, under Additional Requirements to AWP A M2.
- .3 Wood must be treated after leveling on its 4 sides (P4F).
- .4 Wood must be dried and incised before the pressure treatment.
 - .1 All wood must have air-dried at the supplier to achieve a maximum moisture content of 25% prior to CCA treatment. This drying must take place while the wooden pieces are arranged in bales and spaced by furs so as to allow a free flow of air on the four faces of each piece, all being protected from the weather. Obtain from the supplier a written certificate stating that the drying has been carried out in accordance with the foregoing and provide a copy of this attestation to the Agency's Representative.
- .5 All surfaces treated with CCA should be completely covered with a sealant recommended by the authorized signatory of the CCA treatment plant.
- .6 Carry out wood preservation treatments in accordance with the recommendations of the Best Management Practices for the Use of Treated Wood in Aquatic Environment (BMP).
- .7 After treatment with a preservative, dry materials until a moisture content not exceeding 19%.
- .8 Provide a document certifying that all parts have been impregnated at the plant in accordance with the requirements of this specification.

3.3 FIELD TREATMENT

- .1 Comply with AWP A M4 and revisions specified in CSA O80 Series, Supplementary Requirements to AWP A M2.

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- .2 Other treatments, when it is impossible to avoid cutting or drilling; apply an abundant layer of preservative recommended by the authorized signatory of the treatment plant.

END OF SECTION

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MISCELLANEOUS ROUGH CARPENTRY

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 06 05 73 *Wood Treatment*

1.2 REFERENCE STANDARDS

- .1 Canadian Wood Council
 - .1 Wood Design Manual 2010 (R2014) Edition
 - .2 Engineering Guide for Wood Frame Construction 2014
- .2 CSA Group (CSA)
 - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O86-14 Engineered Design in Wood
 - .3 CSA O121-08(R2013), Douglas Fir Plywood.
 - .4 CSA O141-05(R2014), Softwood Lumber.
 - .5 CSA O151-09(R2014), Canadian Softwood Plywood.
 - .6 CSA O153-13, Poplar Plywood.
 - .7 CAN/CSA-Z809-08, Sustainable Forest Management.
 - .8 CAN/CSA O80 Serie (2015) Wood Preservation
- .3 Forest Stewardship Council (FSC)
 - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
 - .2 FSC-STD-20-002, Structure and Content of Forest Stewardship Standards V2-1.
 - .3 FSC accredited certification organizations.
- .4 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber.
- .5 National Research Council Canada (NRC)
 - .1 National Building Code of Canada (NBC), last edition.
- .6 Sustainable Forestry Initiative (SFI)
 - .1 SFI Standard.
- .7 It is the Supplier's responsibility to refer to all applicable codes and standards for the supply of materials. The Supplier shall comply with the latest edition and revision of all documents of the American Society for Testing Materials and International (ASTM), the Canadian Standards Association (CSA) and other standards related to products.
- .8 All wood should be processed and shaped according to the guidelines of the BMP - Best Management Practices for the use of treated wood in aquatic and sensitive environments.

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MISCELLANEOUS ROUGH CARPENTRY

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and with manufacturer's written instructions.
 - .1 Wood shall be slatted and covered for transportation.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground with moisture barrier at both ground level and as a cover forming a well-ventilated enclosure, with drainage to prevent standing water.
 - .2 Replace defective or damaged materials with new.
 - .3 Store separated reusable wood waste convenient to cutting station and work areas.

Part 2 Products

2.1 MATERIALS AND PRODUCTS FOR TREATED WOOD

- .1 The wood shall conform to the following:
 - .1 White Oak quality "Select Car Stock" according to the "National Hardwood Lumber Association."
 - .2 "Select Structural" BC Fir (or Douglas Fir) according to the NLGA Canadian Lumber Grading Rules.
 - .3 Spruce quality "Select Structural" according to the classification rules for Canadian lumber "of NLGA.
 - .4 The pieces of wood shall not include any cracks, wane, slot or equivalent defect on each of these faces. The nodes shall be healthy and the core shall be solid wood. Only wormholes with a diameter of 3 mm or less in limited quantities will be tolerated.
 - .5 No cavities in any form will be tolerated.
 - .6 Pieces of wood shall be cut and planed on 4 sides (P4F), providing an extra thickness on parts before drying to ensure that the final dimensions will be respected after performing leveling and finishing on all four sides, even if the parts are warped before leveling.

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MISCELLANEOUS ROUGH CARPENTRY

.7 Preservative treatment in accordance with Section 06 05 73- Wood Treatment.

2.2 ACCESSORIES

.1 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers, hot dip galvanised.

Part 3 Execution

3.1 CONSTRUCTION OF TREATED WOOD

.1 Inform workers that treated wood is a hazardous material and precautions should be taken to ensure that they act accordingly.

.2 Treat cuts and bored holes in accordance with Section 06 05 73. Apply preservative to dry surfaces, do not apply in rainy conditions.

3.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 00- Cleaning.

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

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00- Cleaning.

3.3 WASTE MANAGEMENT

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

.2 Re-use scrap lumber to the greatest extent possible. Separate scrap lumber for use on site as accessory components, including: bracing, and blocking. Eliminate shavings and scrap containing Chromated Copper Arsenate (ACC).

.3 Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill. Prevent saw dust and wood shavings from entering the storm drainage system.

.4 Do not burn pressure treated wood.

.5 Do not send lumber treated to co-generation facilities or “waste-to-energy” facilities.

.6 Work over tarpaulins to collect sawdust and drops of preservatives and mop up excess preservatives using absorbents.

.7 Quickly recover all sawdust, excess preservatives, spills and contaminated soils. Store sawdust, scrap and other contaminated waste in sealed containers and dispose of in authorized sites according to regulations.

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MISCELLANEOUS ROUGH CARPENTRY

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by rough carpentry installation.

END OF SECTION

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EXTERIOR PAINTING OF STRUCTURAL STEEL

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 02 83 12 – *Lead Base Paint Abatement Maximum Precautions*
- .2 Section 05 50 00 – *Metal Fabrications*

1.2 REFERENCE STANDARDS

- .1 The Master Painters Institute (MPI)
 - .1 Exterior Structural Steel and Metal Fabrications.
- .2 The Society for Protective Coatings (SSPC)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide in accordance with Section 01 33 00- Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's instructions, printed product literature and data sheets for painting exterior metal surfaces and include product characteristics, performance criteria, physical size, limitations, curing times and finish.
 - .2 Submit 2 copies of WHMIS SDS in accordance with Section 01 35 29.06- Health and Safety Requirements and Section 01 35 43- Environmental Procedures.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00- Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Develop a Construction Waste Management Plan related to Work of this Section.

1.5 PAINTING OF MISCELLANEOUS ITEMS

- .1 Painting works include complete painting of elements, requiring complete surface preparation (System A, System B and System D), and encapsulation painting, requiring partial surface preparation (System C).
- .2 All components of the paint system shall come from a single manufacturer.
- .3 Stainless steel surfaces shall not be painted.
- .4 The Contractor shall take the necessary measures to avoid painting or staining concrete, stone or wood of existing structures.
- .5 The Contractor shall take the necessary measures to avoid damaging concrete, stone or wood from existing structures.

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EXTERIOR PAINTING OF STRUCTURAL STEEL

Part 2 Products

2.1 MATERIALS

- .1 Abrasive for blasting abrasive: according to the Steel Structures Painting Council (SSPC).
- .2 Paint products for « Painting System A »
 - .1 Paint System A shall be used for painting the following elements :
 - .1 Upstream and downstream sill armouring angles;
 - .2 Upper and lower pivots and U-shape clamps;
 - .3 Supporting angles of counterweight box on doors;
 - .4 Steel components of Sluice Gates;
 - .5 Vertical and diagonal plates encased in wood on doors;
 - .6 Upstream and downstream Armouring plates upon which the doors rest;
 - .7 Armouring plates located on the left wall downstream of the downstream doors;
 - .8 Bent plates to be installed on right and left walls upstream of the upstream doors.
 - .2 All steel surfaces shall be coated with a paint system consisting of a high resistance Epoxy Resin coating with a high resistance against abrasion as indicated below or equivalent accepted by the Agency's Representative.
 - .1 Primer : Application of one coat of Intershield 300 (aluminium color) with a dry film thickness of 100 to 150 µm (4 à 6 mils), followed by the application of one coat of Intershield 300 (bronze color) with a dry film thickness of 100 to 150 µm (4 à 6 mils);
 - .2 Painting : Application of one coat of Intergard 5377 (red color) with a dry film thickness of 100 to 150 µm (4 à 6 mils), followed by the application of one coat of Intergard 5377 (black color) with a dry film thickness of 100 to 150 µm (4 à 6 mils).
- .3 Paint products for « Painting System B »
 - .1 Paint System B shall be used for painting the following elements:
 - .1 Door opening mechanisms and attachments;
 - .2 Sluice Gates opening mechanisms;
 - .3 Steel éléments of Footbriges, including anchor plates;
 - .4 Footbridge Guardrails ;
 - .5 Guardrail segments touched by works for the new rack trenches of door opening mechanisms;
 - .6 Steel covers on top of doors;
 - .7 New trenches closing plates and replacement plates of control cabinets.
 - .2 All steel surfaces shall be coated with a paint system consisting of a high resistance Epoxy Resin coating with a high resistance against abrasion, followed

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EXTERIOR PAINTING OF STRUCTURAL STEEL

by an Acrylic Polyurethane UV protection coating as indicated below or equivalent accepted by the Agency's Representative.

- .1 Primer : Application of one coat of Intershield 300 (aluminium color) with a dry film thickness of 100 to 150 μm (4 à 6 mils);
 - .2 Painting : Application of one coat of Intergard 5377 (red color) with a dry film thickness of 100 à 150 μm (4 à 6 mils), followed by the application of one coat of Intergard 5377 (black color) with a dry film thickness of 100 to 150 μm (4 à 6 mils);
 - .3 UV Protection : Application of one coat of Interthane 990HS (black color) with a dry film thickness of 50 to 75 μm (2 à 3 mils).
- .4 Paint products for « Painting System C »
- .1 Paint System C shall be used for the following elements :
 - .1 Visible face of 100x100 plates (grey color);
 - .2 Surfaces of Protection plates crossing the lock which are affected by the cutting of existing anchors or the drilling of new anchors.
 - .2 Steel surfaces shall be coated with a paint system consisting of a Copolymer with a high concentration of Crystalline Calcium Sulfonate as indicated below or equivalent accepted by the Agency's Representative.
 - .1 Primer : Before applying the paint system, all bolts, interfaces between connected elements, welds, corners, sharp edges and other details favorable to premature corrosion, shall be soaked with Termarust series 2200 penetrating sealant. All exceeding sealant shall be removed.
 - .2 Painting : Application of Termarust series 2100 :
 - .1 Dry film thickness of 250 to 300 μm (10 à 12 mils) on bare steel surfaces exposed by surface preparation;
 - .2 Dry film thickness of 125 to 150 μm (5 à 6 mils) on steel surfaces where the existing coating has been preserved.
- .5 Paint products for « Painting System D »
- .1 Paint System D shall be used for the following elements :
 - .1 Steel surfaces affected by the welding works on checkered plates to be bolted (black color).
 - .2 Steel surfaces shall be coated with a Zinc rich coating, with a minimal zinc content of 87% in the dry film.
 - .1 Paint brush application of two coats of paint, with a minimal total dry film thickness of 130 μm (5,1 mils).

Part 3 Execution

3.1 EXAMINATION

- .1 The Contractor shall conform to the requirements of this section, to the recommendations of the manufacturer, including technical bulletins and application instructions given in

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EXTERIOR PAINTING OF STRUCTURAL STEEL

product catalogs, packaging and technical data sheets. In case of contradiction or divergence between the documents, the most severe requirement, recommendation or specification, to the benefit of ParksCanada Agency, shall prevail.

- .2 Verification of Conditions: verify that condition of substrates is acceptable for painting exterior metal surfaces installation in accordance with manufacturer's written recommendations and the requirements of this section.
 - .1 Prior to the application of a layer of the paint system, visually inspect substrate in presence of Agency's Representative.
 - .2 the Contractor shall note that any existing paint at the lock contains lead and that scrap from the removal of existing paint shall be considered hazardous material. Liquids and solids from paint removal work shall be recovered, stored, characterized and disposed of in accordance with applicable regulations.

3.2 PREPARATION

- .1 Smudges and deformations shall be removed by grinding. Sharp edges shall be rounded with a minimum radius of 1,5 mm.
- .2 Steel elements to be painted :
 - .1 Clean all surfaces to be painted : remove any vegetal material, mud, loose, cracked, friable or non adhering paint, rust, mill scale, rolling oxide, weld slag, dirt, oil, grease and all other foreign substance.
 - .2 Prepare surfaces to be painted :
 - .1 Complete painting (System A and System B) :
 - .1 Non galvanized steel : prepare surface according to SSPC-SP10 at minimum.
 - .2 New galvanized steel : prepare surface according to SSPC-SP16 at minimum, taking precautions not to damage zinc surface.
 - .3 Existing steel : (armouring plates encased in lock concrete walls), prepare surface according to SSPC-SP5.
 - .4 Upper and lower pivots (cast iron) : prepare surface according to SSPC-SP5.
 - .2 Encapsulation painting (System C) :
 - .1 Prepare surface according to SSPC-SP6 or SSPC-WJ-3 (L à M) at minimum.
 - .3 Complete painting (System D) :
 - .1 Prepare surface according to SSPC-SP11 at minimum.
 - .3 Remove traces left by stripping on surfaces as well as in cavities and angles to be painted, using clean brushes or a vacuum cleaner, or by means of a jet of dry and clean compressed air.
 - .4 Galvanized surfaces to be painted shall be prepared according to ASTM D6386 *Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting*.

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EXTERIOR PAINTING OF STRUCTURAL STEEL

- .5 Do not apply paint until prepared surfaces are inspected and accepted the Agency' Representative.

3.3 APPLICATION

- .1 Ends of connecting parts (rods, bolts, washers and nuts) resting on elements to be painted shall also receive the same coating system.
- .2 Surfaces exposed as a result of surface preparation shall be covered with a first coat of paint as soon as possible after surface preparation and before appearance of rust, without exceeding 8 hours following preparation.
- .3 Supply cover when paint shall be applied in damp or cold weather. Supply, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified. Protect until paint is dry or until weather conditions are suitable.
- .4 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .5 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Handling painted elements:
 - .1 Handle painted elements after paint has dried, or when necessary for handling for painting or stacking for drying.
 - .2 Scrape off and touch up paint which is damaged in handling, with same number of coats of paint as were previously applied to metal.

3.4 FIELD QUALITY CONTROL

- .1 Site Tests, Inspections:
 - .1 The dry film thickness of each paint coat shall conform, in all points, to the minimum required in this section.
 - .2 The dry film thickness of the various coats of paint shall be determined according to the requirements of SSPC-PA 2 - *Procedure for Determining Conformance to Dry Coating Thickness Requirements*.
 - .3 The Contractor shall measure the wet film thickness of paint during application, all along the progression of works, to insure that required final dry thickness is obtained.
 - .4 The System paint film shall have a minimum adhesion of 3A according to « Test Method A – X-Cut Tape Test » described in the Standard ASTM D3359 *Standard Test Methods for Rating Adhesion by Tape Test*.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 – Cleaning and Section 02 83 12 – Lead Base Paint Abatement Maximum Precautions.

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EXTERIOR PAINTING OF STRUCTURAL STEEL

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning and Section 02 83 12 – Lead Base Paint Abatement Maximum Precautions.

3.6 PROTECTION

- .1 Protect painted surfaces from damage during construction.
- .2 Protection of surfaces:
 - .1 Protect surfaces not to receive paint.
 - .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
 - .3 Protect cleaned and freshly painted surfaces from dust to approval of Agency's Representative.
- .3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

END OF SECTION

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COMMON WORK RESULTS FOR ELECTRICAL

Part 1 General

1.1 REFERENCE STANDARDS

- .1 CSA Group.
 - .1 CSA C22.1-F15, Canadian Electrical Code, Part 1 (23rd Edition), Safety Standard for Electrical Installations.
 - .2 CSA C22.2 No. 0.3-06(R2014), Test Methods for Electrical Wires and Cables.
 - .3 CAN/CSA-C22.3 No.7-F10, Underground Systems.
 - .4 CAN3-C235-83(R2010), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
 - .5 CSA 282-09, Emergency Electrical Power Supply for Buildings.
 - .6 CSA-Z462-15, Electrical Safety.
- .2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC).
 - .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.2 DEFINITIONS

- .1 Electrical and Electronic Terms: Unless otherwise specified or indicated, terms used in these specifications and on drawings are those defined by IEEE SP1122.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit for review single line electrical diagrams under plexiglass, in A1 format, and located in the main electrical installations local.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
 - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .5 If changes are required, notify Agency Representative of these changes before they are made.

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COMMON WORK RESULTS FOR ELECTRICAL

- .4 Electrical Arc-Flash Danger:
 - .1 Supply the "Arc-Flash" report. The study must be signed by a certified engineer from the province of Quebec.
 - .2 Supply and install a label on each electrical equipment (excepted those who comply to article 4.3.3.1 of the CSA Z462 Standard), as requested by CCQ-E and types "Figures Q.2 and Q.3" as indicated in appendix Q of the CSA Z462 Standard. The manufacturer must affix the labels on the equipment according to the study results.
- .5 Certificates.
 - .1 Provide CSA certified material and equipment.
 - .2 Where CSA certified equipment and material is not available, submit such equipment and material to an authority having jurisdiction for approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of Contract.
 - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
 - .6 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Agency Representative.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance data:
 - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
 - .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment;
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures;
 - .3 Safety precautions;
 - .4 Procedures to be followed in event of equipment failure;
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
 - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
 - .4 Post instructions where directed.
 - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.

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COMMON WORK RESULTS FOR ELECTRICAL

- .6 Ensure operating instructions will not fade when exposed to sunlight.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: Deliver material and equipment to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials, indoor, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse as specified in Waste Reduction Workplan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 WORK UNDER TENSION AND DANGER OF ARCING FLASH

- .1 All work must be done off.
- .2 Live work:
 - .1 All work must be done off. However, if the Contractor is to perform live work for exceptional reasons, the latter must make a written request to the Agency Representative with a clear indication of the conditions requiring live work.
 - .2 Any work carried out on live equipment must be carried out in accordance with the CSA Standard Z462 "Safety in the Field of Electricity at Work". Refer to tables 1 and 4 of CSA Standard Z462.
 - .3 The Contractor must obtain acceptance from the Agency Representative before starting the work under tension.
- .3 "Electric Arc Hazard" Marking:
 - .1 Provide and install a label on all electrical equipment (except those that comply with CSA Z462, item 4.3.3.1), as requested by the CCQ-E and of type "Figure Q.1", as shown in Appendix Q of CSA Z462 Standard.

Part 2 Products

2.1 DESIGN REQUIREMENTS

- .1 Operating Voltages: To CAN3-C235.
- .2 Motors, electric heating, control, and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above Standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

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COMMON WORK RESULTS FOR ELECTRICAL

- .3 Language Operating Requirements: Provide identification nameplates for control items in French and English.
- .4 Use one nameplate for each language.

2.2 MATERIAL AND EQUIPMENT

- .1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Equipment and material to be CSA certified. Where CSA certified are equipment and material is not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
- .3 Factory assemble control panels and component assemblies.

2.3 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Prior to installation:
 - .1 Visually inspect substrate in presence of Agency Representative.
 - .2 Inform Agency Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from the Agency Representative.

3.2 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1, except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.71, except where specified otherwise.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete.
 - .1 Sleeves through concrete: Plastic, sized for free passage of conduit, and protruding 50 mm.
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

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COMMON WORK RESULTS FOR ELECTRICAL

- .3 Install cables, conduits, and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.4 LOCATION OF OUTLETS

- .1 Locate outlets in accordance with Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays, and fuses are installed to required values and settings.

3.6 FIELD QUALITY CONTROL

- .1 Load Balance:
 - .1 Measure phase current of all existing and new panel boards with normal loads operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
 - .2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
 - .3 Provide upon completion of work, load balance report as directed in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS, phase and neutral currents on panel boards, dry-core transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.

3.7 CLEANING

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

END OF SECTION

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SELECTIVE DEMOLITION FOR ELECTRICAL

Part 1 General

1.1 SUMMARY

1. This section includes requirements for selective demolition and removal of electrical installations.
2. Selective demolition works shall consist, but are not limited to, the removal and disposition, in whole or in part, of the following equipment and networks:
 - .1 Transfer Switch and Associated Circuits;
 - .2 Electrical power of instrumentation-control and industrial mechanics loads;
 - .3 Hydraulic, mechanical and instrumentation-control systems associated with the lock and valve opening and closing system;
 - .4 Unless otherwise stated, all equipment connected to the programmable automation computer of the instrumentation and control panel;
 - .5 The PPU-1 panel and associated circuits.

1.2 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.3 REFERENCE STANDARDS

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

1.4 DEFINITIONS

- .1 Demolish: Detach items from existing construction and legally dispose of items off site, unless indicated as removed and salvaged or removed and reinstalled.
- .2 Remove: Planned deconstruction and disassembly of electrical items from existing construction including removal of conduit, junction boxes, cabling and wiring from electrical component to panel, taking care not to damage adjacent assemblies designated to remain; legally dispose of items off site, unless indicated as removed and salvaged or removed and reinstalled. Put the protective devices in the "off" position and indicate that the circuit is spare.
- .3 Remove and Salvage: Detach items from existing construction and deliver them to Agency Representative ready for reuse.
- .4 Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- .5 Existing to Remain: Existing items of construction that are maintained onsite.

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SELECTIVE DEMOLITION FOR ELECTRICAL

- .6 Hazardous Substances: Dangerous substances, dangerous goods, hazardous commodities and hazardous products may include asbestos, mercury and lead, PCB's, poisons, corrosive agents, flammable substances, radioactive substances, or other material that can endanger human health or wellbeing or environment, if handled improperly, as defined by Federal Hazardous Products Act (RSC 1985), including latest amendments.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate work of this Section to avoid interference with work by other Sections.

1.6 QUALITY ASSURANCE

- .1 Regulatory Requirements: Perform work of this Section in accordance with:
 - .1 Provincial/Territorial Workers' Compensation Boards/Commissions.

1.7 SITE CONDITIONS

- .1 Existing Conditions: Condition of materials identified as being salvaged or demolished are based on their observed condition at time of site examination, before tendering.
- .2 Discovery of Hazardous Substances: It is not expected that Hazardous Substances will be encountered in Work; immediately notify Agency Representative if materials suspected of containing hazardous substances are encountered and perform following activities:
 - .1 Refer to Section 01 41 00 - Regulatory Requirements for directives associated with specific material types;
 - .2 Hazardous substances will be as defined in Hazardous Products Act;
 - .3 Stop work in area of suspected hazardous substances;
 - .4 Take preventative measures to limit users' and workers' exposure. Provide barriers and other safety devices and do not disturb;
 - .5 Hazardous substances will be removed by Agency Representative under a separate contract or as a change to Work;
 - .6 Proceed only after written instructions have been received from Agency Representative.

Part 2 Products

2.1 MATERIALS

- .1 Electrical Repair Materials: Use only new materials, CSA or ULC labelled as appropriate and matching components remaining after work associated with components identified for removal or demolition are completed.
- .2 Fire stopping Repair Materials: Use fire stopping materials compatible with existing fire stopping systems where removal or demolition work affects rated assemblies, restore to match existing fire-rated performance.

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SELECTIVE DEMOLITION FOR ELECTRICAL

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Existing Conditions: Visit site, thoroughly examine and become familiar with conditions that may affect the work of this Section before tendering the Bid; Agency Representative will not consider claims for extras for work or materials necessary for proper execution and completion of the contract that could have been determined by a site visit.

3.2 PREPARATION

- .1 Protection of existing systems to remain: Protect systems and components indicated to remain in place during selective demolition operations:
 - .1 Prevent debris from blocking drainage inlets;
 - .2 Protect systems that will remain in operation.

3.3 EXECUTION

- .1 Coordinate requirements of this Section as follows:
 - .1 Remove existing electrical devices and equipment including associated conduits, boxes, wiring, and similar items, unless specified otherwise;
 - .2 Perform demolition work in a neat and workmanlike manner:
 - .1 Remove tools or equipment after completion of work and leave site clean and ready for subsequent renovation work;
 - .2 Repair and restore damages caused as a result of work of this Section to match existing materials and finishes.
 - .3 Remove existing conduits, boxes, cabling and wiring associated with removed electrical devices and equipment.

3.4 CLOSEOUT ACTIVITIES

- .1 Demolition Waste Disposal: Arrange for legal disposal and remove demolished materials to accredited provincial landfill site or alternative disposal site (recycle centre).

END OF SECTION

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WIRE AND BOX CONNECTORS (0-1000 V)

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC).
 - .1 EEMAC 1Y-2-1961, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 National Electrical Manufacturers Association (NEMA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with the manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

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WIRE AND BOX CONNECTORS (0-1000 V)

- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

- .1 Pressure Type Wire Connectors: To CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors, as required.
- .2 Fixture Type Splicing Connectors: To CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing Stud Connectors: To NEMA and to consist of:
 - .1 Connector body and stud clamp for round copper conductor.
 - .2 Clamp for stranded copper conductors.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper conductors.
 - .5 Sized for conductors as indicated.
- .4 Clamps or connectors for TECK cable, armoured cable, aluminum sheathed cable, mineral insulated cable, as required, to CAN/CSA-C22.2 No.18.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Agency Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from Agency Representative.

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WIRE AND BOX CONNECTORS (0-1000 V)

3.2 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and cables, and, depending, proceed with the following:
 - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation must meet secureness tests in accordance with CAN/CSA-C22.2 No.65;
 - .2 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap;
 - .3 Install bushing stud connectors in accordance with pertinent NEMA Regulations and in accordance with the manufacturer's recommendations.

3.3 CLEANING

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

END OF SECTION

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WIRE AND CABLES (0-1000 V)

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 26 05 20 - Wire and Box Connectors (0-1000 V).
- .3 Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts.

1.2 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA)/ CSA International.
 - .1 CSA C22.2 No. 0.3, Testing Methods for Electrical Cables and Wires.
 - .2 CAN/CSA-C22.2 No. 131, TECK 90 Cables.
- .2 ULC Laboratories.
 - .1 ULS-S139-00, Method of Fire Test for Evaluation of Integrity of Electrical Cables.

1.3 PRODUCT DATA

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

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 BUILDING WIRES

- .1 Conductors: Stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Copper Conductors: Size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE, as indicated on drawings.

Part 3 Execution

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform the tests according to the methods approved by the local Authority Having Jurisdiction over installation.

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WIRE AND CABLES (0-1000 V)

- .3 Perform tests before energizing electrical system.

3.2 GENERAL - CABLE INSTALLATION

- .1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .2 Cable Colour Coding: To Section 26 05 00 - Common Work Results for Electrical.

3.3 INSTALLATION OF BUILDING WIRES

- .1 Install wiring:
 - .1 In conduits, in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

END OF SECTION

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GROUNDING - SECONDARY

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE).
 - .1 ANSI/IEEE 837-02, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions to install the grounding products. Printed product literature and data sheets for grounding equipment must include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance data for grounding equipment for incorporation into manual.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with the manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoor, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

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GROUNDING - SECONDARY

Part 2 Products

2.1 EQUIPMENT

- .1 Insulated Grounding Conductors: Green, copper conductors, size as indicated.
- .2 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including, but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Bolted type conductor connectors.
 - .3 Pressure-wire connectors.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate/supports.
 - .2 Inform Agency Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION - GENERAL

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Install connectors in accordance with manufacturer's instructions.
- .2 Protect exposed grounding conductors from mechanical injury.
- .3 Use mechanical connectors for grounding connections to equipment provided with lugs.

3.3 SYSTEM AND CIRCUIT GROUNDING

- .1 Install system and circuit grounding connections.

3.4 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment in, but not necessarily limited to following list: Transfer switch and receptacle.

3.5 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

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GROUNDING - SECONDARY

- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of the local Authority Having Jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

3.6 CLEANING

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

END OF SECTION

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors, in dry location, off ground, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect hangers and supports from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 SUPPORT CHANNELS

- .1 "U" shape, size 41 x 41 mm, 2.5 mm thick, set in poured concrete walls and ceilings, suspended, or surface mounted.
- .2 Galvanized steel supports.
- .3 Fasteners made of galvanized steel.

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Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Agency Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after received of written approval to proceed from the Agency Representative.

3.2 INSTALLATION

- .1 Secure equipment to poured concrete with expandable inserts.
- .2 Support transformer, spring loaded bolts, and accessories designed as accessories to basic channel members.

3.3 CLEANING

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

END OF SECTION

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SEISMIC RESTRAINT SYSTEMS (SRS)

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE).
 - .1 ASHRAE, Applications Handbook (SI).
- .2 American Society for Testing and Materials International (ASTM).
 - .1 ASTM E488-10, Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.
- .3 Canadian Standards Association (CSA International).
 - .1 CSA G40.20/G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .5 National Research Council Canada (NRC-CNRC).
 - .1 National Building Code of Canada (NBC) - 2015.
- .6 Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA).
 - .1 SMACNA, Addendum No. 1, September 2000 to Seismic Restraint Manual, Guidelines for Mechanical Systems.
 - .2 SMACNA, Seismic Restraint Manual, Guidelines for Mechanical Systems.

1.3 DEFINITIONS

- .1 SRS: Acronym for Seismic Restraint System.

1.4 DESCRIPTION

- .1 SRS fully integrated into, and compatible with:
 - .1 Noise and vibration controls specified.
 - .2 Structural, mechanical, electrical design of project.
- .2 Systems, equipment not required to be operational during and after seismic event.
- .3 During seismic event, SRS to prevent systems and equipment from causing personal injury and from moving from normal position.
- .4 Designed by a Professional Engineer specializing in design of SRS and registered in Province of Quebec.

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SEISMIC RESTRAINT SYSTEMS (SRS)

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submittals: In accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Quebec, Canada.
 - .2 Submit design data including:
 - .1 Full details of design criteria.
 - .2 Design calculations, including restraint loads resulting from seismic forces in accordance with National Building Code (detailed work sheets and tables).
 - .3 Separate shop drawings for each SRS and devices for each system, equipment.
 - .4 Identification of location of devices.
 - .5 Schedules of types of SRS equipment and devices, and related items.
 - .6 Details of fasteners and attachments to structure, anchorage loadings, attachment methods.
 - .7 Installation procedures and instructions.
 - .8 Design calculations including restraint loads to NBC and Supplement.
 - .3 Quality Assurance Submittals:
 - .1 Certificates: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: Submit manufacturer's installation instructions.

1.6 RESPONSABILITIES

- .1 Each contractor is responsible for the seismic measures undertaken and required by his trade.
- .2 The conception of each seismic device must be designed by an engineer that is registered to practice in Quebec, Canada, mandated by the Contractor. The engineer must sign and seal the design drawings.

1.7 ANCHORING DEVICES

- .1 Install the anchoring devices and the seismic stabilizers for the conduits and equipment according to the prescriptions in the "ASHRAE, A Practical Guide to Seismic Restraint" book, the ANSI-SMACNA 001 Standard and according to the building classification.

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SEISMIC RESTRAINT SYSTEMS (SRS)

Part 2 Products

2.1 GENERAL

- .1 All electrical equipment mounted on suspended ceilings must be attached directly to the building structure.
- .2 Seismic devices must prevent permanent displacement and damage caused by the horizontal and vertical movements, and overturning.
- .3 Seismic devices must be compatible with the electromechanical design. They should not interfere with normal operation of electromechanical systems.
- .4 SRS to provide gentle and steady cushioning action and avoid high impact loads. The latter must not interfere with any sound or vibration treatment elements.
- .5 Fasteners and attachment points to resist same load as seismic restraints.
- .6 Fasteners installed with a nail gun or in holes made to this effect are prohibited.
- .7 No device or related support nor any plot should yield before the structure or the structure breaks.
- .8 SRS utilizing cast iron or threaded pipe is not permitted.
- .9 Seismic control measures not to interfere with integrity of firestopping.

2.2 SRS DEVICES

- .1 The supports must be complete with longitudinal and transverse bracings. They can be rigid or cable types.
- .2 Do not stabilize material if the length of the suspension rods is less than 300 mm.
- .3 Stabilize the channels and electrical conduits of 35 mm nominal diameter and more, located in mechanical rooms.
- .4 Stabilize the channels and electrical conduits of 63 mm nominal diameter and more, located outside of mechanical rooms.
- .5 Install mechanical restraint devices at the following frequency:
 - .1 For transversal restraint:
 - .1 SHL-A: every 6.1 m linear meters;
 - .2 SHL-B: every 10 linear meters;
 - .3 SHL-C: every 12.2 linear meters.
 - .2 For longitudinal restraint:
 - .1 SHL-A: every 12 linear meters;
 - .2 SHL-B: every 20 linear meters;
 - .3 SHL-C: every 24.4 linear meters.
- .6 A transversal bracing can serve as a longitudinal brace, if the latter is installed 600 mm away from a channel/conduit direction change.

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SEISMIC RESTRAINT SYSTEMS (SRS)

2.3 SRS FOR STATIC EQUIPMENT, SYSTEMS

- .1 The material must be fixed to the suspension supports that must be installed to the structure.
- .2 Use of or many of the following methods below or as per indications on drawings:
 - .1 Anchor equipment supports to structure;
 - .2 Stabilize the equipment mechanically using cables;
 - .3 Brace suspensions in each plane;
 - .4 Brace the suspensions to the structure.
- .3 SCS to prevent sway in horizontal plan, “rocking” in vertical plane, sliding and buckling in axial direction.
- .4 Hanger rods to withstand compressive loading and buckling.

Part 3 Execution

3.1 INSTALLATION

- .1 To withstand same maximum load that seismic restraint is to resist and in every direction.
- .2 Confirm that the connection to the conduits and channels will not diminish the flexibility of the antivibration elements, and the conduits and channels will not transmit vibrations.
- .3 For equipment with no integrated attach points, provide attach points with “belt” systems.
- .4 The structural base of any equipment must be stabilized to prevent toppling.
- .5 A 25-mm clearance must be respected between a SRS and any service element.

3.2 ANCHORS

- .1 Check that anchor bolts, diameters of the ankles, depth of the indentations in the concrete and length of the welds are done according to the drawings submitted for approval.
- .2 Bolt all the material that is not insulated to vibration transmission to the structure.
- .3 Oblong openings for adjustment bolts are prohibited.
- .4 To improve seismic resistance, smaller conduits and channels can be attached to larger conduits and channels that will retain them. The inverse practice is prohibited.
- .5 Anchors in the concrete slabs should be removed from the edges following the standard ASTM E488 and recommendations of the manufacturer of the anchors.

3.3 SLACK CABLE SYSTEMS (SCS)

- .1 Connect to suspended equipment so that axial projection of wire passes through centre of gravity of equipment.

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SEISMIC RESTRAINT SYSTEMS (SRS)

- .2 Use appropriate grommets, shackles, other hardware to ensure alignment of restraints and to avoid bending of cables at connection points.
- .3 Orient restraint wires on ceiling hung equipment at approximately 90° to each other (in plan), tie back to structure at maximum of 45° to structure.
- .4 Tighten cable to reduce slack to 19 mm under thumb pressure. Cable not to support weight during normal operation.

3.4 INSTALLATION VERIFICATION FROM MANUFACTURER

- .1 The engineer that designed the SRS must be on-site to verify the conformity of the installation. Then, the latter must supply a report containing deficiency resolving recommendations (if any) to the Agency Representative.
- .2 If applicable, the Contractor must make the necessary corrections and adjustments based on the written report submitted by the supplier.

END OF SECTION

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.1-F15, Canadian Electrical Code, Part 1, 23rd Edition.
 - .2 CSA C22.2 No.40 (R2009), Short Circuit, Junction and pull Boxes.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 CONDUIT BOXES

- .1 Cast FS or FD aluminum boxes with factory-threaded hubs and mounting feet for surface wiring of devices.

2.2 FITTINGS - GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 35 mm and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.

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Part 3 Execution

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CAN/CSA C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985(R2003), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-M1984(R2003), Rigid PVC (Unplasticized) Conduit.
 - .6 CAN/CSA C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.

1.4 QUALITY INSURANCE

- .1 Test Report: Submit the testing reports delivered by independent and well-known laboratories.
- .2 Certification: Submit the signed documents from the manufacturer, certifying that the products and materials satisfy the required physical characteristics and performance criteria.
- .3 Instructions: Submit installation instructions supplied by the manufacturer.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

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1.6 GENERAL

- .1 All the conduits, tubes, and their paths are not necessarily on the drawings. Those that are present are represented schematically.
- .2 For communications and fire alarm, the entire length of all the cables must be painted in the factory. The color required per cable is as specified in Section 26 05 00.

Part 2 Products

2.1 CONDUITS

- .1 Electrical Metallic Tubing (EMT): To CSA C22.2 No. 83, with watertight couplings.
- .2 Conduits and tubes to have a minimal nominal diameter of 21 mm, unless noted otherwise.

2.2 CONDUIT FASTENINGS

- .1 One-hole galvanized steel straps to secure surface conduits 50 mm and smaller.
 - .1 Two-hole steel straps for conduits larger than 50 mm.

2.3 CONDUIT FITTINGS

- .1 Fittings: To CAN/CSA C22.2 No. 18, manufactured for use with conduit specified.
Coating: Same as conduit.
- .2 Ensure factory "ells" where 90° bends for 25 mm and larger conduits.
- .3 Watertight connectors and couplings for EMT.
 - .1 Set-screws are not acceptable.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings for linear expansion at entry to panel.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

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3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION

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Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 Insulated Cable Engineers Association, Inc. (ICEA).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and datasheets for cables, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect cables from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 CABLE PROTECTION

- .1 Yellow indicator cable to locate conduits that are buried in the soil or other protection as per indications on drawing.

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Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for cable installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Agency Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 CABLE INSTALLATION IN DUCTS

- .1 Install cables in ducts as indicated.
- .2 Do not pull spliced cables inside ducts.
- .3 Install multiple cables in duct simultaneously.
- .4 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.

3.3 CLEANING

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

3.4 PROTECTION

- .1 Repair damage to adjacent materials caused by cables installation.

END OF SECTION

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WIRING DEVICES

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CAN/CSA C22.2 No.42.1-F00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national Standard, with UL 514D).
 - .3 CSA C22.2 No.55-FM1986(R2008), Special Use Switches.
 - .4 CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national Standard, with UL 20).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for wiring devices, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.
 - .1 Indicate on drawings:
 - .1 The details surrounding the integration in the architectural elements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for wiring devices for incorporation into O&M Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

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

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WIRING DEVICES

- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wiring devices from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse in accordance with Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 RECEPTACLES

- .1 Duplex receptacles of specified "Industrial" grade type, CSA type 5-15 R, 125 V, 15 A, "U" ground, with following features:
 - .1 Ivory urea moulded housing;
 - .2 Suitable for No. 10 AWG for back and side wiring;
 - .3 Break-off links for use as split receptacles;
 - .4 Eight back wired entrances, four side wiring screws;
 - .5 Triple wipe contacts and rivetted grounding contacts.
- .2 Single outlet receptacles for maintenance, specified "Industrial" quality allowing 15 and 20 A inputs, type CSA 5-20R, 125 V, 20 A.
- .3 Single outlet receptacles, twist-lock, specified "Industrial" quality, type CSA L5-20R, 125 V, 20 A.
- .4 Other outlets designed for allowable tension and ampacity: According to indications on drawings.
- .5 Receptacles of one manufacturer throughout project.

2.2 COVER PLATES

- .1 Stainless steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .2 All the cover plates must originate from a single and same manufacturer.
- .3 Stainless steel cover plates must be installed according to the specifications for the secured areas, mounted in built-in pull boxes.
- .4 Cast cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.

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WIRING DEVICES

- .5 Weatherproof during use, double lift spring-loaded cast aluminum cover plates, complete with gaskets for outdoor-rated duplex receptacles, as indicated.
- .6 All installations must be provided by a single manufacturer.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wiring devices installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Agency Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
- .2 Cover Plates:
 - .1 Install suitable common cover plates where wiring devices are grouped.
 - .2 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

3.3 CLEANING

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

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WIRING DEVICES

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Protect stainless-steel cover plate finish with paper or plastic film until painting and other work is finished.
- .3 Repair damage to adjacent materials caused by wiring device installation.

END OF SECTION

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FUSES - LOW VOLTAGE

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No.106-05(R2010), HRC-Miscellaneous Fuses.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide fuse performance data characteristics for each fuse type and size above 200 A. The supplied characteristics should also include the average fusion time at a given current.
- .3 Shop Drawings:
 - .1 Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Quebec.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Ship fuses in original containers.
- .2 Do not ship fuses installed in switchboard.
- .3 Store fuses in original containers in storage cabinet.
- .4 Waste Management and Disposal:
 - .1 Separate waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

1.5 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Three spare fuses of each type and size installed above 600 A.
- .3 Six spare fuses of each type and size installed up to and including 600 A.

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FUSES - LOW VOLTAGE

Part 2 Products

2.1 FUSES - GENERAL

- .1 Fuse type references L1, L2, J1, R1, etc., have been adopted for use in this Specification.
- .2 Fuses: Product of one manufacturer.

2.2 FUSE TYPES

- .1 Class L fuses, 200 kA interruption capacity.
 - .1 Type L1: Time delay, capable of carrying 500% of its rated current for 10 s minimum.
 - .2 Type L2: Fast acting.
- .2 Class J fuses, 200 kA interruption capacity.
 - .1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

Part 3 Execution

3.1 INSTALLATION

- .1 Install fuses in mounting devices immediately before energizing circuit.
- .2 Ensure correct fuses fitted to physically matched mounting devices.
- .3 Ensure correct fuses fitted to assigned electrical circuit.
- .4 Install spare fuses in fuse storage cabinet.

END OF SECTION

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MOULDED CASE CIRCUIT BREAKERS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No. 5-09, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national Standard with UL 489, and NMX-J-266-ANCE-2010).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Include time-current characteristic curves for breakers with interrupting capacity of 22,000 A symmetrical (rms) and over at system voltage and with an allowable ampacity of 200 A and more.
- .4 Certificates:
 - .1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit three copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet Standards and Regulations.
 - .1 Production certificate of origin must be submitted to Agency Representative for approval.
 - .2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.
 - .3 Any work of manufacturing, assembly, or installation to begin only after acceptance of production certificate of origin by Agency Representative. Unless complying with this requirement, Agency Representative reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.

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MOULDED CASE CIRCUIT BREAKERS

- .4 Production certificate of origin must contain the following information:
 - .1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate;
 - .2 Licensed dealer's name and address and person of distributor responsible for Contractor's account;
 - .3 Contractor's name and address, as well as person responsible for project;
 - .4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate;
 - .5 Name and address of building where circuit breakers will be installed:
 - .1 Project title.
 - .2 End user's reference number.
 - .3 List of circuit breakers.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store circuit breakers in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect circuit breaker from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for reuse as specified in Section 01 74 19 - Waste Management and Disposal.

Part 2 Products

2.1 GENERAL REQUIREMENTS

- .1 Moulded-case circuit breakers, circuit breakers, accessory high-fault protectors and ground-fault circuit-interrupters: To CSA C22.2 No. 5
- .2 Bolt-on Moulded Case Circuit Breaker: Quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- .3 Common-trip Breakers: With single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
 - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.

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MOULDED CASE CIRCUIT BREAKERS

- .5 Circuit breakers to have minimally the same current interruption capacity as the panel it is installed in.

2.2 THERMAL MAGNETIC BREAKERS (DESIGN A)

- .1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short-circuit protection.

2.3 ADDITIONAL FEATURES

- .1 Include:
 - .1 "On-Off" locking device for each breaker.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Agency Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 INSTALLATION

- .1 Install circuit breakers as indicated.

3.3 CLEANING

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

END OF SECTION

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EMERGENCY LIGHTING

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 26 05 21 - Wires and Cables (0-1000 V).
- .3 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.2 REFERENCE STANDARDS

- .1 CSA Group (CSA).
 - .1 CSA C22.2 No.141-10, Emergency Lighting Equipment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature, and data sheets for emergency lighting, and include product characteristics, performance criteria, physical size, finish, and limitations.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: Submit operation and maintenance (O&M) data for emergency lighting for incorporation into O&M Manual.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, indoor, and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect emergency lighting from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: Remove for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

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EMERGENCY LIGHTING

1.6 WARRANTY

- .1 For batteries in this Section, the 12-month warranty period is extended to 120 months. Replacements must be carried-out without any costs during the first 5 years and with calculated prorated fees during the following 5 years.

1.7 TENSION DROP

- .1 The lighting conductors must be copper, of appropriate caliber so that the tension drop does not exceed 5% of the nominal tension, in accordance with the manufacturer's recommendations.

Part 2 Products

2.1 EQUIPMENT

- .1 Emergency Lighting Equipment: To CSA C22.2 No.141.
- .2 Supply Voltage: 120 VAC.
- .3 Output Voltage: 12 VDC.
- .4 Operating Time: Minimally 120 minutes.
- .5 Minimal Power: 350 W.
- .6 Battery: Sealed, maintenance free, and with an expected life of 10 years.
- .7 Charger: Solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01 V for plus or minus 10% input variations.
- .8 Solid-state transfer circuit.
- .9 Low-Voltage Disconnect: Solid-state, modular, operates at 80% battery output voltage.
- .10 Signal Lights: Solid-state, for "AC Power ON" and "High Charge".
- .11 Lamp Heads: Integral on unit and remote, 345° horizontal and 180° vertical adjustment. Lamp type: Two 4 W, 12 V LED lamps, with no reflection, integrated in a polycarbonate enclosure.
- .12 LED Lighting:
 - .1 LED lighting components must be in accordance with ANSI C78-377, NEMA SSL 3, and IES LM 79 and LM 80.
 - .2 Power: According to indications.
 - .3 Initial luminous flux: According to indications.
 - .4 CRI indicator: 86.
 - .5 Color temperature: 4,000 K.

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EMERGENCY LIGHTING

- .6 Minimal life span: 50,000 h.
 - .1 Luminous flux after 50,000 hours: No less than 70% of the initial luminous flux.
- .13 Cabinet: Suitable for direct or shelf mounting to wall and c/w knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .14 Finish: Beige, 18 caliber steel.
- .15 Auxiliary Equipment:
 - .1 Ammeter.
 - .2 Voltmeter.
 - .3 Test switch.
 - .4 Time delay relay.
 - .5 Battery disconnect device.
 - .6 AC input and DC output terminal blocks inside cabinet.
 - .7 Shelf.
 - .8 Cord and single twist-lock plug connection for AC.
 - .9 RFI suppressors.
 - .10 Two fuse circuits.

2.2 WIRING OF REMOTE HEADS

- .1 Conduit: Type EMT according to Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.
- .2 Conductors: RW 90, according to Section 26 05 21 - Wires and Cables (0-1000 V) and in accordance with manufacturer's recommendations.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for emergency lighting installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Agency Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

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EMERGENCY LIGHTING

3.2 INSTALLATION

- .1 Install unit equipment and remote mounted fixtures.
- .2 Direct heads.
- .3 Connect exit lights to unit equipment.

3.3 CLEANING

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

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by emergency lighting installation.

END OF SECTION

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EXIT SIGNS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 - Common Work Results for Electrical.
- .2 Section 26 05 21 - Wires and Cables (0-1000 V).
- .3 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.2 REFERENCE STANDARDS

- .1 CSA Group.
 - .1 CSA C22.2 No.141-15, Emergency Lighting Equipment.
 - .2 CSA C860-11(R2016), Performance of Internally-Lighted Exit Signs.
- .2 International Organization for Standardization (ISO).
 - .1 ISO 3864-1 2011, Graphical Symbols - Safety Colours and Safety Signs - Part 1: Design Principles for Safety Signs and Safety Markings.
 - .2 ISO 7010 2011, Safety Colours and Safety Signs - Registered Safety Signs.
- .3 National Fire Protection Association (NFPA).
 - .1 NFPA 101-2015, Life Safety Code.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications, and data sheets, and include product characteristics, performance criteria, physical size, finish, and limitations.
- .3 Quality Assurance Submittals: Submit following in accordance with Section 01 45 00 - Quality Control.
 - .1 Instructions: Submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

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

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EXIT SIGNS

Part 2 Products

- .1 Housing: Aluminum border profile.
- .2 Face and Back Plates: Cast aluminum alloy.
- .3 Luminous panel, white LED type with a life span of 10 years.
- .4 Green pictogram and white graphical symbol (Running Man) and directional arrows.
- .5 Housing Finish: Brushed aluminum.
- .6 Universal mounting unit, for wall mount, cantilevered or ceiling mounted, simple or double face.
- .7 Left or right arrows.
- .8 Protection grille according to indications on drawing.
- .9 Complying with CAN/CSA-C860-01 and CSA 22.2 No.141 Standards.
- .10 120 V and 347 V, universal power supply.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Install exit lights to manufacturer's recommendations, listing requirements, NFPA standard and local regulatory requirements.
- .2 Connect fixtures to exit light circuits.
- .3 Connect emergency lamp sockets to emergency circuits.
- .4 Lock exit light circuit breaker in on position.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION

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Appendix I Mitigation Measures

CCHM-(1446) – ÉCLUSE 4 - TABLEAU DES MESURES D'ATTÉNUATION

Composantes du projet	Composantes de l'environnement	Description des effets environnementaux	Mesures d'atténuation des impacts	Importance des effets résiduels
1. Planification générale	<ul style="list-style-type: none"> ➤ Qualité des sols ➤ Qualité de l'eau ➤ Faune et flore 	<ul style="list-style-type: none"> • Érosion et sédimentation • Destruction ou modification de l'habitat pour la faune • Mortalité d'individus fauniques causée par les activités du projet 	<p>1.1 Veiller à ce que tous les travailleurs passent en revue les mesures d'atténuation et toutes les considérations propres au site avant le début des travaux.</p> <p>1.2 Présenter un plan d'aménagement qui délimite, sur une parcelle déjà perturbée (p. ex. route, surface en gravier), les chemins d'accès au site ainsi que les différentes aires nécessaires au projet telles que l'aire de travail, l'aire de rassemblement, l'aire d'entreposage, l'aire de nettoyage de la machinerie, les stationnements et en préciser la durée d'utilisation. Ces aires doivent avoir été approuvées par le Représentant de l'APC.</p> <p>1.3 Éviter les éléments sensibles (faune, flore, ressources culturelles) et toute zone d'activité restreinte connexe désignée par l'APC. Si d'autres éléments fragiles sont trouvés, cesser tous les travaux immédiatement et aviser le Représentant de l'APC afin de déterminer les prochaines étapes.</p> <p>Faune</p> <p>1.4 Si des animaux sont observés à l'intérieur ou à proximité du chantier, assurer une sortie adéquate et sécuritaire des lieux pour les éloigner des zones de conflits/accidents potentiels et signaler toute observation au Représentant de l'APC pour s'assurer, entre autres, du respect des exigences législatives reliées aux espèces en péril.</p> <p>1.5 Ne pas tendre des pièges, harceler, nourrir, appâter, leurrer, empoisonner ou tuer des animaux sur le chantier.</p> <p>1.6 S'assurer qu'aucun poisson ne puisse être réintroduit dans la zone asséchée de l'écluse par le drain du mur de chute ou rester prisonnier dans le drain si ce dernier est bouché d'un côté ou redirigé vers l'aval de l'écluse.</p> <p>1.7 S'assurer que la zone asséchée soit exempte de poissons tout au long des travaux. Si un poisson est observé, arrêter les travaux puis aviser le responsable de Parcs Canada afin de repêcher, relocaliser et identifier l'espèce.</p>	Négligeable, temporaire et localisé
	<ul style="list-style-type: none"> ➤ Expérience du visiteur 	<ul style="list-style-type: none"> • Augmentation du niveau de bruit ambiant et nuisance sonore 	<p>1.8 Identifier les principales personnes-ressources, ainsi que leurs rôles et responsabilités respectifs avant d'entreprendre les travaux et transmettre l'information à tous les travailleurs sur place.</p> <p>1.9 Se conformer aux lois, réglementations, normes, codes et bonnes pratiques relatifs à la santé et sécurité du public, aux bruits, aux horaires de travail et aux nuisances, ainsi qu'à tout autre risque relié aux composantes des travaux.</p> <p>1.10 Arrêter les moteurs de la machinerie, les outils et équipements bruyants lors des arrêts ou pauses des travaux.</p> <p>1.11 Gérer le chantier de façon à minimiser les travaux qui engendrent des activités sonores importantes.</p> <p>1.12 Planifier les activités bruyantes de façon à réduire au minimum les répercussions sur les visiteurs et les résidents à proximité.</p>	Nul une fois les travaux terminés
2. Mise en chantier / Démobilisation	<ul style="list-style-type: none"> ➤ Qualité des sols et de l'eau ➤ Flore et faune terrestres ➤ Ressources aquatiques (faune et flore) ➤ Santé humaine 	<ul style="list-style-type: none"> • Apport de contaminants dans le sol et l'eau • Introduction ou dispersion d'EEE • Perturbation / stress pour diverses espèces de poissons • Risque de dommages au système racinaire, aux branches et à l'écorce des arbres dus aux déplacements de la machinerie 	<p>2.1 <i>Mesure 1.2.</i></p> <p>Protection du milieu aquatique</p> <p>2.2 L'eau du canal ne peut être utilisée pour effectuer le lavage des équipements ou d'autres opérations de chantier sans autorisation préalable du Représentant de Parcs Canada.</p> <p>2.3 S'il y a présence d'eau résiduelle dans les biefs amont et aval des écluses, mettre en place un rideau de turbidité à l'intérieur de la zone de mobilisation prévue dans le canal pour toute la durée des travaux, le plus près possible de la zone de travaux (ex. seuil de porte) en fonction de l'espace requis pour les travaux. Avant d'enlever le rideau, attendre que les matières en suspension se soient déposées au fond et enlever les sédiments accumulés.</p> <p>2.4 Les eaux de précipitation et de ruissellement doivent être déviées en milieu terrestre dans une zone de végétation tampon pour infiltration, loin du plan d'eau et des sols dénudés, ou dirigées vers un bassin de sédimentation ou une structure de filtration pour réduire les apports de particules vers le canal. S'il y a un risque de contamination au chantier, ces eaux doivent être confinées et échantillonnées. Si elles présentent des dépassements des normes en vigueur, elles doivent être traitées.</p>	Négligeable, temporaire et localisé

Composantes du projet	Composantes de l'environnement	Description des effets environnementaux	Mesures d'atténuation des impacts	Importance des effets résiduels
			<p>2.5 Si un système de traitement (bassin de décantation, filtres ou autres installations de ce genre) doit être utilisé, celui-ci doit empêcher les contaminants et les sédiments de ruisseler vers les égouts et les plans d'eau. Utiliser les moyens nécessaires pour définir le mode d'élimination des sédiments captés et des eaux résiduaires.</p> <p>2.6 Obtenir l'autorisation du Représentant de Parcs Canada avant de procéder à tout rejet d'eau à l'environnement.</p> <p>2.7 Mettre en place des mesures efficaces pour limiter l'apport de sédiments et de débris provenant du chantier vers le milieu aquatique (ex. barrière à sédiments, berme, trappe à sédiments, bassin de sédimentation, stabilisation temporaire des talus, déviation des eaux vers des zones de végétation). Les mesures doivent demeurer efficaces lors de la fermeture temporaire du chantier et lors de fortes pluies. Porter attention à limiter le déplacement des particules dans le plan d'eau lors du retrait des installations. Tous les ouvrages de lutte contre l'érosion et le contrôle des sédiments doivent être en place avant d'entreprendre les travaux.</p> <p>2.8 Ne rejeter aucun déblai, matériaux, rebuts ou débris dans le milieu aquatique. Retirer tous débris introduits accidentellement dans le milieu aquatique dans les plus brefs délais.</p> <p>2.9 S'assurer qu'aucune substance nocive ne soit immergée, rejetée dans le milieu aquatique ou en un lieu qui risquerait de contaminer le milieu aquatique, tel que requis par la <i>Loi sur les Pêches</i> et la <i>Loi de 1994 sur la Convention concernant les oiseaux migrateurs</i>.</p> <p>2.10 Aucune neige enlevée lors du déneigement ne peut être disposée dans un canal, conformément au <i>Règlement sur les canaux historiques</i>.</p> <p>2.11 Utiliser des bacs de rétention (capacité de 110 %) ou des tapis à carburant imperméable avec une berme pour tous les équipements et la machinerie stationnaires (génératrices, compresseurs, etc.) localisés en rive et inspecter les installations durant les périodes de pluie afin d'éviter qu'il n'y ait de débordement.</p> <p>2.12 Les toilettes mobiles doivent être installées loin des systèmes d'égouts pluviaux, des zones sensibles d'un point de vue environnemental (arbres, canal, etc.) et des routes pavées. S'assurer qu'elles sont bien ancrées au sol.</p> <p>Arbres et arbustes</p> <p>2.13 Établir et délimiter une aire de protection autour des arbres et arbustes à protéger (ex. clôtures, rubans, barrières, etc.) afin de ne pas les endommager ou affecter le réseau racinaire. En cas d'impossibilité, installer un système de protection des troncs et du système racinaire (planches de bois, matériel non compactant avec géotextile, etc.). En aucun cas un arbre ne peut être utilisé comme support.</p> <p>2.14 Les branches susceptibles d'être endommagées doivent être protégées ou élaguées.</p> <p>2.15 Ne pas peindre, endommager ou marquer des éléments naturels (ex. roches, arbres) présents sur le chantier et aux alentours pour fins d'arpentage ou autres avant d'en avoir obtenu préalablement l'autorisation de l'APC.</p> <p>2.16 Dans le cas où des arbres sont endommagés durant les travaux, fournir un rapport d'un ingénieur forestier incluant une évaluation du potentiel de survie des arbres touchés. Si la survie des arbres est affectée par les dommages, ils devront être remplacés selon les indications du Représentant de Parcs Canada.</p> <p>Espèces exotiques envahissantes</p> <p>2.17 S'assurer que la machinerie est propre et exempte d'espèces envahissantes et de mauvaises herbes nuisibles à son arrivée sur le site et la maintenir dans cet état par la suite.</p>	
3. Entreposage de matériaux et de matières dangereuses Utilisation, circulation,	<ul style="list-style-type: none"> ➤ Qualité de l'air ➤ Qualité des sols ➤ Qualité de l'eau ➤ Santé humaine 	<ul style="list-style-type: none"> ➤ Émission de gaz à effet de serre (CO, CO₂, NO_x) et d'O₃ et de particules fines dans l'air ➤ Élargissement de l'empreinte anthropique 	<p>3.1 <i>Mesures 1.2, 1.10 à 1.12, 2.11, 2.13 à 2.17.</i></p> <p>Circulation de la machinerie</p> <p>3.2 Préconiser la mobilisation/circulation des véhicules sur des surfaces durables ou déjà perturbées (ex. route pavée, surface en gravier, zone perturbée à forte résilience) et éviter la zone du système racinaire des arbres (minimalement la zone de projection au sol de la ramure).</p> <p>3.3 Nettoyer les chemins d'accès et les voies de circulation régulièrement durant les travaux.</p>	Négligeable, temporaire et localisé

Composantes du projet	Composantes de l'environnement	Description des effets environnementaux	Mesures d'atténuation des impacts	Importance des effets résiduels
ravitaillement et nettoyage de la machinerie		<ul style="list-style-type: none"> ➤ Tassement du sol et formation d'ornières ➤ Érosion du sol, perte de terre végétale et exposition des sous-sols ➤ Sédimentation causant de la turbidité ➤ Risque de dommages au système racinaire, aux branches et à l'écorce des arbres dus aux déplacements de la machinerie ➤ Contamination de l'eau et des sols par des matières dangereuses (MD), des déchets et des fuites d'hydrocarbure par la machinerie ➤ Contamination croisée 	<p>Qualité de l'air</p> <p>3.4 S'assurer que les systèmes d'échappement et antipollution de la machinerie, de l'équipement et tout autre matériel de construction soient maintenus en bon état.</p> <p>3.5 Se conformer à la réglementation municipale en vigueur en ce qui a trait aux émissions de poussières dans l'air.</p> <p>3.6 Mettre en place des mesures appropriées pour réduire les émissions de poussières dans l'air (ex. arrosage des matériaux secs, balayage, utilisation de bâches, etc.).</p> <p>3.7 Éviter la manipulation et le transport de matériaux pouvant facilement s'éroder ou lorsqu'un panache de poussière est visible.</p> <p>3.8 Les camions à benne transportant des matériaux (sols, béton, matériaux granulaires et tout autre type de matériaux) doivent être munis de bâches étanches.</p> <p>Entreposage</p> <p>3.9 Limiter les aires d'entreposage à des surfaces durables ou déjà perturbées. En cas d'impossibilité, les aires d'entreposage envisagées doivent avoir été approuvées par Parcs Canada. Le matériel et la machinerie ne peuvent être entreposés au-dessus du système racinaire des arbres.</p> <p>3.10 L'entreposage de produits pétroliers et de matières dangereuses, ainsi que l'entretien, le ravitaillement et le nettoyage de la machinerie doivent être effectués à plus de 30 m du plan d'eau, sur un site aménagé à cet effet où il n'existe aucun risque de contamination des sols et des eaux souterraines et de surface.</p> <p>3.11 Tout amoncellement temporaire de matériaux non consolidés localisé à moins de 30 m d'un milieu aquatique et laissé en place pour une période de plus de 24 h doit être protégé à l'aide d'une barrière à sédiments et recouvert d'une toile étanche afin d'éviter le transport de sédiments dans le plan d'eau.</p> <p>3.12 Respecter toutes lois, règlements, normes et mesures préventives de santé et sécurité relatifs au cadenassage, à l'entreposage, à l'affichage, à la communication, à l'entretien de la zone d'entreposage, à la manipulation et à la disposition spécifiques aux matières dangereuses présentes sur le chantier.</p> <p>3.13 Pourvoir le chantier de construction de conteneurs adéquats pour le stockage temporaire et sécuritaire des déchets dangereux, lesquels doivent être séparés par catégories.</p> <p>3.14 S'il y a entreposage temporaire des composantes recouvertes de peinture au plomb, déposer celles-ci sur une bâche étanche afin de limiter la contamination du sol.</p> <p>Hydrocarbures</p> <p>3.15 Utiliser un système hydraulique à l'huile végétale biodégradable pour l'ensemble de la machinerie qui circule en rive, dans le fond de l'écluse ou sur une installation temporaire dans le canal. Une preuve de l'application de cette mesure d'atténuation pourrait être exigée.</p> <p>3.16 Maintenir en bon état et entretenir régulièrement les véhicules et les équipements. Réparer immédiatement ou enlever du chantier les véhicules ou équipements qui ont des fuites.</p> <p>3.17 Ne laisser aucun véhicule, machinerie et/ou équipement à essence à moins de 10 m du canal ou dans le fond d'une écluse en dehors des heures de travail ou lors des fermetures prolongées du chantier, à moins d'être confiné dans une enceinte étanche. En cas d'impossibilité, des mesures de protection des sols devront être aménagées sous l'équipement ou la machinerie durant toute la période susmentionnée (ex. bac de confinement ayant un volume équivalent à au moins 110 % du volume du réservoir de carburant de l'équipement ou de la machinerie).</p> <p>3.18 Prévoir des trousse de récupération d'hydrocarbures en quantité suffisante (boudins de confinement, rouleaux absorbants, récipients étanches, etc.) et un extincteur de catégorie conforme aux normes en vigueur afin de gérer tout déversement, incident environnemental ou incendie. S'assurer que les travailleurs soient formés pour intervenir rapidement en cas de fuite ou de déversements et qu'ils soient informés de l'emplacement des trousse.</p> <p>3.19 Préparer une procédure d'urgence et un plan de communication en cas de déversement, d'incident environnemental ou d'incendie. Cette procédure doit inclure, sans toutefois s'y limiter, les mesures prévues pour colmater les fuites, confiner les produits déversés afin de limiter leur étendue et éviter qu'ils</p>	

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			<p>n'atteignent des zones sensibles, récupérer les contaminants à la source, décontaminer les zones touchées et éliminer le matériel contaminé conformément aux lois, politiques et règlements en vigueur. La réhabilitation des aires affectées doit être entreprise sans délai.</p> <p>3.20 En cas d'incident environnemental, aviser l'APC, le service d'urgence d'Environnement Canada (1-866-283-2323) et toute autre autorité compétente en matière d'urgence environnementale.</p> <p>3.21 Effectuer le ravitaillement en carburant sur une surface imperméable et dans une aire confinée.</p> <p>3.22 Nettoyer les fuites et les déversements qui surviennent pendant le ravitaillement et éliminer adéquatement les matières contaminées.</p> <p>3.23 Ne jamais éliminer ou déposer du carburant dans l'environnement ou dans un plan d'eau.</p> <p>3.24 Procéder au nettoyage des outils et de l'équipement hors site. S'il est nécessaire de le faire sur place, le nettoyage doit se faire à un endroit situé à moins 30 m de tout plan d'eau.</p>	
	➤ Niveau sonore	<ul style="list-style-type: none"> • Augmentation du niveau de bruit ambiant 	<p>3.25 Mesures 1.9 à 1.12.</p> <p>3.26 Éviter le rabattement des panneaux arrière des camions à benne.</p> <p>3.27 Arrêter les moteurs de la machinerie, les outils et équipements à moteur lors des arrêts ou pauses des travaux.</p> <p>3.28 S'assurer du bon fonctionnement des silencieux ou du dispositif antibruit des équipements bruyants.</p>	
4. Excavation mineure et remblayage	<ul style="list-style-type: none"> ➤ Qualité de l'eau ➤ Qualité des sols ➤ Faune, flore 	<ul style="list-style-type: none"> • Érosion et sédimentation • Sédimentation causant de la turbidité • Modification de l'habitat • Apport de substances contaminées dans l'environnement • Contamination croisée 	<p>4.1 Mesures 2.7 à 2.10, 3.5 à 3.8, 3,9 et 3.11.</p> <p>4.2 Un plan de gestion des sols contaminés, advenant leur présence sur le secteur de réalisation des travaux, devra être présenté à l'APC pour approbation, avant la réalisation des travaux d'excavation. Une caractérisation complémentaire devra être effectuée si la qualité des sols en place n'est pas connue avec précision.</p> <p>4.3 Éviter de procéder à l'excavation pendant les périodes où le sol est saturé, où la pluie est abondante et où il y a du ruissellement, de forts vents ou de la neige mouillée.</p> <p>4.4 Limiter le temps d'entreposage in situ des matériaux excavés. Privilégier le chargement direct sur les différents chantiers, surtout en présence de matériaux contaminés.</p> <p>4.5 Gérer les déblais (entreposage et disposition) en fonction de leur nature (ex.: terre végétale, remblai), de leur volume et de l'importance de leur contamination (ex. : critères génériques, recommandations) selon les lois et règlements fédéraux, provinciaux et municipaux en vigueur.</p> <p>4.6 Prendre les précautions nécessaires lors de l'entreposage temporaire des déblais afin de contrôler la dispersion des éléments fins et d'éviter la contamination des sols sous-jacents et adjacents. Prévoir minimalement de :</p> <ul style="list-style-type: none"> • Ségréguer les déblais selon leur nature et leur niveau de contamination; • Entreposer les déblais sur une toile imperméable et les recouvrir par des toiles fixées solidement afin d'éviter qu'elles soient soulevées par le vent; • Installer des barrières à sédiments de manière à ceinturer les différentes zones d'entreposage des déblais; • En tout temps, s'assurer que les sols ne migrent pas vers d'autres milieux, soit par voie aérienne, par ruissellement ou par transit de véhicule; • Ne pas entreposer les matériaux contaminés excavés à proximité du plan d'eau. <p>4.7 Toute la machinerie étant entrée en contact avec des déblais contaminés devra être nettoyée adéquatement avant d'être utilisée dans d'autres secteurs.</p> <p>4.8 En cas de découverte d'objets ou de vestiges archéologiques, interrompre les travaux immédiatement et aviser le personnel de Parcs Canada concerné.</p> <p>4.9 Lors de la disposition des déblais contaminés, conserver tout document ou bordereau attestant de leur disposition dans des sites autorisés par le MDDELCC selon leur degré de contamination.</p> <p>4.10 Utiliser un matériau de remblai propre, exempt de contaminants et d'espèces indésirables.</p>	Négligeable, temporaire et localisé

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5. Installation temporaire dans le lit du canal Aménagement d'une rampe d'accès Enrochement permanent	<ul style="list-style-type: none"> ➤ Qualité de l'eau, des sédiments, ressources aquatiques et santé humaine 	<ul style="list-style-type: none"> • Risque de détérioration de la qualité de l'eau par l'apport de sédiments • Apport de matériaux et contaminants dans le milieu aquatique (eau et sédiments) • Modification de l'habitat du poisson (compaction des sédiments, modification du lit) 	5.1 Aucun empiètement permanent, changement de profil ou changement de matériau de surface du lit du canal en amont et en aval de l'écluse n'est permis, sauf pour l'enrochement permanent du mur d'approche amont et aval gauche autorisé par Pêches et Océans Canada (MPO). 5.2 Les empiètements temporaires dans le lit du canal doivent être minimisés le plus possible pour ne pas engendrer de perte d'habitat du poisson. À la fin des travaux, le profil et les matériaux formant le lit du canal doivent rester les mêmes qu'avant le début des travaux. 5.3 Ne prendre aucun matériau d'emprunt dans le canal. 5.4 La machinerie ne devra en aucun temps circuler directement sur les sédiments du canal en dehors de l'écluse. 5.5 S'assurer que l'intérieur de l'écluse soit complètement asséché avant de faire circuler de la machinerie sur le plancher. 5.6 S'assurer que le lit du canal soit à sec avant d'installer un remblai ou tout autre type d'installation temporaire. 5.7 La méthode d'accès aux berges et au canal, le cas échéant, doit préalablement être approuvée par Parcs Canada. 5.8 Aménager et localiser les accès de manière à limiter le transport de sédiments par ruissellement et érosion. Installer des dispositifs de lutte contre l'érosion et la sédimentation. 5.9 S'assurer que les matériaux de la surface de roulement ne soient en aucun cas en contact avec les sédiments du fond du canal si une surface de roulement temporaire est aménagée au fond du canal pour la circulation de la machinerie. Un dispositif de séparation des sédiments (ex. géotextile) doit être installé. 5.10 Limiter la circulation de la machinerie uniquement sur les surfaces temporaires et aux accès aménagés à cet effet. 5.11 Retirer la machinerie du fond du canal en dehors des heures de chantier. 5.12 Nettoyer tout équipement avant de les faire entrer dans le canal afin de s'assurer qu'ils soient exempts de contaminants et d'espèces végétales indésirables. Les inspecter quotidiennement pour s'assurer qu'ils ne fuient pas. 5.13 Remettre en état le lit du canal suite à l'enlèvement du matériel granulaire, du géotextile et/ou de toute autre installation temporaire, pour retrouver les mêmes conditions qu'avant les travaux. S'assurer que le matériel n'est pas contaminé par des fuites de la machinerie, sinon ce dernier devra être disposé selon le <i>Guide d'intervention – Protection des sols et réhabilitation des terrains contaminés</i> du MDDELCC.	
6. Démolition de béton et bétonnage	<ul style="list-style-type: none"> ➤ Qualité de l'air ➤ Qualité de l'eau ➤ Santé humaine ➤ Qualité des sols 	<ul style="list-style-type: none"> • Émission de GES, d'O₃ et de particules fines • Nuisance sonore • Apport de matériau dans l'environnement • Contamination et perte d'habitat du poisson • Altération des composantes naturelles locales du milieu aquatique due aux produits utilisés • Dégradation de la qualité des sols 	6.1 Mesures 1.9 à 1.12, 2.2, 2.7 à 2.9, 3.5 à 3.8, 3.12, 3.13 3.15, 8.7 et 8.8. 6.2 Prévoir des mesures afin de confiner et récupérer les débris, résidus, particules et poussières (ex. bâches, géotextiles, barrières à sédiments, écrans anti-poussières). S'assurer de limiter le déplacement des résidus dans le plan d'eau lors du retrait des installations. 6.3 Éviter que le béton frais, mouillé et non durci et la poussière de béton n'entrent en contact avec les plans d'eau. 6.4 Récupérer la poussière de béton et autres matières particulaires déposées sur le plancher du sas de l'écluse avant l'immersion de la zone de travail afin d'éviter leur mise en suspension. 6.5 Nettoyer les débris de démolition immédiatement et en disposer dans les sites autorisés par le MDDELCC. 6.6 Les surplus de béton provenant des pompes à béton doivent être versés dans une enceinte confinée et étanche. Après durcissement, les résidus de béton doivent être gérés avec les déchets de construction et éliminés dans une installation approuvée. 6.7 Les eaux de lavage des bétonnières doivent être collectées dans un bassin étanche aménagé de manière à éviter tout écoulement dans l'environnement. L'aire de nettoyage doit être localisée à plus de 30 m du plan d'eau et doit être autorisée au préalable par Parcs Canada. 6.8 Les eaux de lavage peuvent être prises en charge par le fournisseur de béton et ramenées à l'usine de béton pour disposition. Dans le cas contraire, ces eaux doivent être échantillonnées et traitées (le cas échéant) afin de respecter les normes de rejet applicables, soit les recommandations du CCME pour la qualité des eaux – protection de la vie aquatique et les critères de qualité de l'eau de surface du MDDELCC (protection de la vie aquatique – effet aigu).	Négligeable, temporaire et localisé

Composantes du projet	Composantes de l'environnement	Description des effets environnementaux	Mesures d'atténuation des impacts	Importance des effets résiduels
<p>7. Peinture des composantes d'acier</p> <p>Nettoyage / décapage des surfaces</p> <p>Démantèlement et remplacement d'éléments de portes d'écluse</p>	<p>➤ Qualité de l'air</p> <p>➤ Qualité de l'eau</p> <p>➤ Qualité des sols</p> <p>➤ Faune et flore</p>	<ul style="list-style-type: none"> Émission de particules dans l'air (poussières et particules de silice et de plomb) Apport de débris de construction et démolition Contamination des sols Dégradation de la qualité de l'eau par contamination et par apport de sédiments Intoxication chez le travailleur exposé aux particules de silice et de plomb 	<p>7.1 Mesures 3.5 et 3.6.</p> <p>Peinture</p> <p>7.2 Utiliser des produits qui présentent le moins d'effets néfastes pour l'environnement et s'assurer de leur conformité environnementale (ex. <i>Loi canadienne sur la protection de l'environnement</i> (LCPE) et règlements qui en découlent). Par exemple, la peinture utilisée pour restaurer les composantes d'acier et l'abrasif utilisé pour nettoyer les surfaces doivent être exempts de métaux lourds.</p> <p>7.3 Prioriser la restauration (décapage et peinture) des composantes métalliques en atelier plutôt que directement sur le site.</p> <p>7.4 Considérer que la peinture existante des éléments métalliques contient du plomb. Les rebuts provenant d'enlèvement de la peinture doivent être considérés comme des matières dangereuses.</p> <p>7.5 Mettre en place des mesures de protection pour éviter la dispersion des particules de peinture ou autre enduit, par exemple :</p> <ul style="list-style-type: none"> Éviter les périodes de grands vents; Régler le débit du pistolet correctement; Utiliser des écrans pour réduire au maximum les pertes par surpulvérisation; Faire les travaux par encapsulage; Se servir de bâches d'écoulement en plastique pour recueillir et contenir les gouttes, les déversements et les vapeurs de peinture. Se servir de bâches pour transférer de la peinture ou d'autres produits d'étanchéité des contenants d'entreposage et de mélange vers des appareils ou des contenants d'application. S'efforcer d'utiliser des récipients de confinement secondaire ayant une capacité minimale équivalente à 110 % du volume du récipient contenant la peinture afin de réduire à un minimum le risque de déversement. <p>7.6 Nettoyer l'équipement de peinture dans un lieu approuvé par Parcs Canada; éviter que l'eau de lavage ne pénètre dans un plan d'eau.</p> <p>7.7 Éliminer tous les déchets de peinture et de solutions peinture-solvant conformément aux lois fédérales, provinciales et municipales applicables.</p> <p>Résidus de décapage et particules de sablage</p> <p>7.8 Traiter les résidus de sablage avec silice et de peinture au plomb en tant que matières dangereuses résiduelles (MDR), tel que stipulé dans le <i>Règlement sur les matières dangereuses</i>. Mettre en place les mesures adéquates pour :</p> <ul style="list-style-type: none"> Récupérer la totalité des résidus de sablage et de peinture. Entreposer les résidus de façon hermétique. Disposer des résidus dans les sites autorisés par le MDDELCC. <p>7.9 Mettre en place des mesures de confinement et de récupération adéquates pour minimiser l'apport de contaminants dans l'air et les sols, par exemple : Installer un abri et une bâche de récupération pour retenir les particules de sablage au jet et les résidus de peinture générés par les travaux de nettoyage. L'abri devra offrir une imperméabilité pour éviter un lessivage en cas de pluie et un mécanisme de captage au sol pour éviter le rejet dans le canal.</p> <p>7.10 Dans la mesure du possible, utiliser un abrasif présentant des impacts moins importants que la silice, p. ex. l'olivine.</p> <p>7.11 Si l'abrasif utilisé contient de la silice, respecter les teneurs admissibles précisées dans la réglementation en vigueur.</p> <p>7.12 Se référer au <i>Règlement sur la qualité du milieu de travail</i>, S-2.1, r. 11 et au <i>Règlement sur la santé et la sécurité du travail</i>, S-2.1, r. 13.</p> <p>7.13 Utiliser des protections individuelles adéquates selon les valeurs d'exposition aux poussières (masque, gants, lunettes, etc.) selon les valeurs d'exposition au plomb, à la silice et à la poussière.</p>	Négligeable, temporaire et localisé
8. Gestion et disposition des déchets hors site :	<p>➤ Qualité de l'eau</p> <p>➤ Qualité de l'air</p> <p>➤ Qualité des sols</p>	<ul style="list-style-type: none"> Modification de l'habitat faunique et floristique 	<p>Gestion des eaux</p> <p>8.1 Mesures 1.2, 2.2, 2.4 à 2.6, 3.24, 6.7, 6.8 et 7.6.</p>	Négligeable, temporaire et localisé

Composantes du projet	Composantes de l'environnement	Description des effets environnementaux	Mesures d'atténuation des impacts	Importance des effets résiduels
(matériaux de construction, matières dangereuses, eaux de nettoyage, etc.)	➤ Faune et flore	<ul style="list-style-type: none"> Contamination de l'air, l'eau et le sol par des résidus de nettoyage, les déchets et les MDR 	<p>8.2 S'assurer que les eaux résiduaires et les eaux usées générées par les installations et opérations de chantier (ex. eaux de lavage des équipements, eaux de nettoyage des surfaces, eaux résiduelles de sciage de béton) soient confinées et récupérées. Avant leur rejet à l'environnement, ces eaux doivent être échantillonnées et traitées (le cas échéant) afin de respecter les normes de rejet applicables, soit les recommandations du CCME pour la qualité des eaux – protection de la vie aquatique, les critères de qualité de l'eau de surface du MDDELCC (protection de la vie aquatique – effet aigu) et du <i>Règlement 2008-47</i> de la CMM pour les matières en suspension, le pH et les C10-C50. Il sera de la responsabilité de l'entrepreneur de démontrer le respect de ces normes.</p> <p>8.3 Si les eaux ne sont pas conformes aux normes applicables et ne peuvent être traitées sur place, elles devront être récupérées dans des conteneurs étanches et transportées dans un lieu autorisé par le MDDELCC.</p> <p>Matières résiduelles dangereuses et non dangereuses</p> <p>8.4 Mesures 2.8, 3.19, 3.23, 4.4, 4.9, 6.4 à 6.6, 7.4, 7.7 à 7.9.</p> <p>8.5 Éliminer les matériaux de rebut contenant du plomb dans les installations appropriées, conformément à la <i>Loi sur la qualité de l'environnement</i> (L.R.Q., c. Q-2).</p> <p>8.6 Conserver dans un véhicule, un bâtiment sécurisé ou des contenants à l'épreuve de la faune, tous les produits susceptibles d'attirer les animaux (p. ex. produits pétroliers, aliments, contenants de boissons recyclables et déchets). Si c'est possible, conserver les déchets alimentaires séparément des débris de construction et les éliminer quotidiennement.</p> <p>8.7 Répertoire et trier toutes les substances dangereuses ou toxiques (débris de béton, bois traité à la créosote, peinture au plomb, moisissures, excréments d'animaux, peinture, produits automobiles, équipement électrique) ainsi que tous les polluants comme l'essence et les solvants sur le site des travaux. Les manipuler, entreposer et en disposer conformément à la <i>Loi canadienne sur la protection de l'environnement</i> (LCPE), à la <i>Loi de 1992 sur le transport des marchandises dangereuses</i>, au SIMDUT et à toutes autres lois, règlements et normes applicables.</p> <p>8.8 Mettre en place un programme adéquat de gestion pour assurer le confinement et l'élimination des rebuts tels que les débris métalliques, le revêtement bitumineux usagé et les débris de béton. Ces rebuts doivent être autant que possible isolés à la source et recyclés.</p> <p>8.9 Confiner et stabiliser les matières résiduelles non dangereuses à au moins 30 mètres du canal et à l'aire d'entreposage désignée et autorisée.</p> <p>8.10 Éliminer hors du chantier toutes les matières résiduelles non dangereuses et fournir suffisamment de conteneurs pour entreposer les déchets domestiques sur une base journalière.</p> <p>8.11 Récupérer les résidus solides provenant du lavage du matériel de construction et en disposer de manière appropriée.</p> <p>8.12 Entretien régulièrement les installations sanitaires portatives et éliminer les déchets accumulés dans une installation d'élimination appropriée. Les installations portatives doivent avoir une capacité suffisante et être gérées de façon à éviter que des déchets ne soient rejetés dans l'environnement récepteur.</p> <p>8.13 Ne pas faire de feux, ni brûler ou enterrer des déchets de construction, des substances dangereuses ou toute matière (p. ex. plastique).</p>	
9. Remise en état des lieux après la démobilisation	<ul style="list-style-type: none"> ➤ Qualité de l'eau ➤ Qualité des sols Faune et flore 	<ul style="list-style-type: none"> Érosion et sédimentation Introduction ou propagation d'espèces exotiques envahissantes 	<p>9.1 Mesures 2.16, 5.2, 5.13.</p> <p>9.2 Les sols perturbés, mis à nu, les surfaces végétalisées et tous les éléments floristiques perturbés pendant les travaux doivent être remis en état, revégétalisés ou remplacés à la fin des travaux par des méthodes approuvées par le représentant de l'APC afin que le site soit laissé comme à son état initial.</p> <p>9.3 Les travaux de réhabilitation des dommages causés à la végétation, aux éléments naturels et à la faune doivent être réalisés sous la supervision d'un spécialiste qualifié.</p> <p>9.4 Surveiller les parcelles perturbées et revégétalisées jusqu'à ce que le Représentant de Parcs Canada établisse que la végétation indigène y pousse bien et que la propagation des espèces exotiques envahissantes a été évitée.</p> <p>9.5 Les surfaces réhabilitées doivent avoir un degré de compaction et une aération correspondant à l'état initial (pré-travaux).</p> <p>9.6 Assurer un bon drainage des eaux de ruissellement, ce qui peut inclure le rétablissement ou l'amélioration des conditions de drainage d'origine.</p>	Négligeable, temporaire et localisé

Appendix II

Example of Environmental protection plan (EPP)

Company logo

Project Name

Location

Environnemental protection plan (EPP)

Project #

Date

Contractor name

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Document modifications follow-up

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

EPP Objective

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

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

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

Environmental Protection Plan (EPP)

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

1. Contact Information

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

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

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

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

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

1. Worker awareness of EPP

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

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

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

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

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

2. Environmental Regulatory Framework

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

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

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

3. Erosion and sedimentation control

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

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

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

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

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

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

4. Procedure for refueling and maintenance of equipment

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

5. Wastewater, Stormwater and Pump Water Management Plan

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

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

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

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

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

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

6. Excavated soil management plan

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

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

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

7. Vegetation protection

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

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

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

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

8. Residual Materials and Hazardous Materials Management Plan

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

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

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

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

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

This section should include, but is not limited to:

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

9. Protection of wildlife

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

10. Protection of aquatic environments

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

11. Dust and emission control

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

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

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

12. Noise control

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

13. Modalities of restoration of the site at the end of the works

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

14. Emergency Response and Environmental Prevention

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

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

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

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

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

Annexe 1. Mobilization plan

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

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

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

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

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

Annexe 2. Environmental surveillance plan

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

Additional Annexes

Add annexes to include the following:

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

Appendix III
Photos



Photo n° 1
Vue vers l'aval de l'écluse #9 (IMG_2202.jpg).



Photo n° 2
Vue vers l'amont de l'écluse #9 à partir de la rive gauche (IMG_1737.jpg).



Photo n° 3
Salle Électrique de l'écluse #9 – mur Nord (IMG_0499.jpg).



Photo n° 4
Salle Électrique de l'écluse #9 – mur Ouest à l'extrémité Nord (IMG_0500.jpg).



Photo n° 5
Salle Électrique de l'écluse #9 – partie centrale du mur Ouest (RIMG2870.jpg).



Photo n° 6
Salle Électrique de l'écluse #9 – jonction du mur Sud avec le mur Ouest (IMG_0498.jpg).



Photo n° 7
Salle Électrique de l'écluse #9 – vue vers l'Ouest (IMG_0502.jpg).



Photo n° 8
Salle Électrique de l'écluse #9 – vue vers le Sud (IMG_0503.jpg).



Photo n° 9
Salle Électrique de l'écluse #9 – mur le Sud près de la porte (IMG_0503.jpg).



Photo n° 10
Salle Électrique de l'écluse #9 – première porte au pied de l'escalier (IMG_0459.jpg).



Photo n° 11
Porte #4 – vérin de porte (RIMG2845.jpg).



Photo n° 12
Porte #4 – vérin de porte (RIMG2843.jpg).



Photo n° 13
Porte #1 - Vérin de vanne guillotine (DSCN7173.jpg).



Photo n° 14
Porte #1 - Vanne guillotine (RIMG2894.jpg).



Photo n° 15
Porte #3 - Caniveau de conduites traversant le sas de l'écluse (RIMG2896.jpg).



Photo n° 16
Porte #2 - Caniveau de conduites traversant le sas de l'écluse (RIMG2896.jpg).



Photo n° 17
Porte #1 - Caniveau de conduites traversant le sas de l'écluse (DSCN7160.jpg).



Photo n° 18
Exemple de batardeau mis en place en 2018 par l'APC en aval des portes aval de l'écluse #9 (photo APC).



Photo n° 19 – Cabinet de contrôle des portes amont de l'écluse #9 (IMG_2200.jpg).



Photo n° 20 – Moules de l'APC pour pivot inférieur et pivot supérieur des portes d'écluse (photo APC).



Photo n° 21 – Exemple de plaques en acier pour lester les portes amont de l'écluse #7 (IMG_2134.jpg).

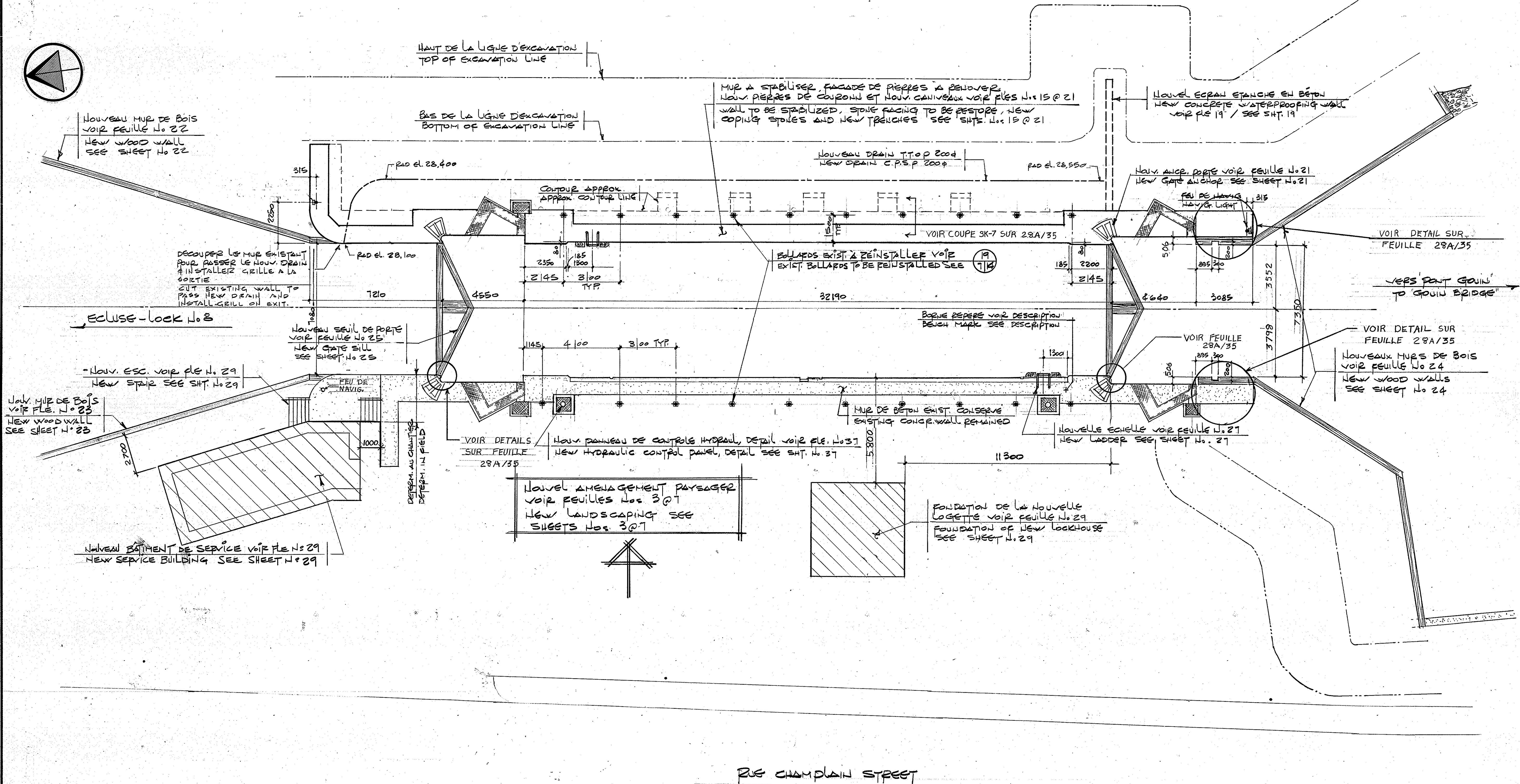
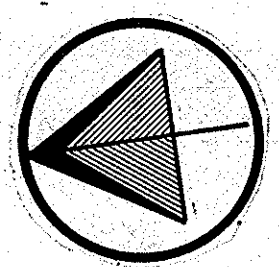
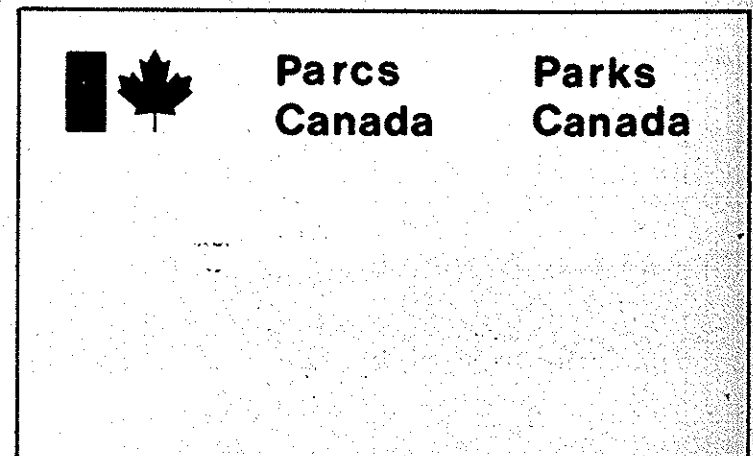


Photo n° 22 - Exemple de plaques en acier pour lester les portes amont de l'écluse #7 (IMG_2137.jpg).

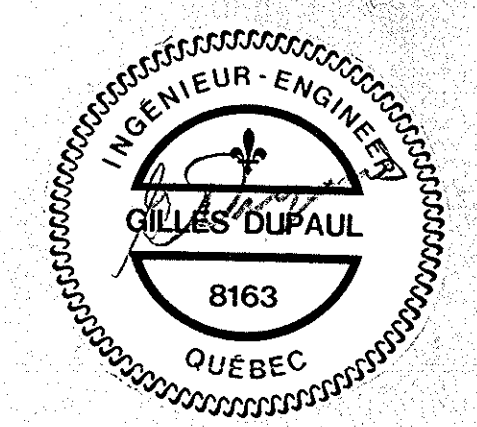
Appendix IV
Lock #9 (geometry)

Bench-Mark No. 801522
 DESCRIPTION: EL. 30,831. MÉDAILLON SUR LE DESSUS DU MUR DE BÉTON DU CÔTÉ OUEST DU CANAL À 2,55 M. AU SUD DES PORTES AMONT DE L'ÉCLUSE ET À 57 CM DE LA FACE DU MUR (ÉTABLI PAR MRBK).

Bench-Mark No. 801522
 DESCRIPTION: EL. 30,831. TABLE IN TOP OF CONCRETE WALL ON WEST SIDE OF CANAL, 2.55 M SOUTH OF UPPER GATES OF LOCK AND 57 CM OF WALL FACE (ESTABLISHED BY MRBK).



DESSAU
 Département de structure
 EMIS
 VÉRIFIÉ
 GILLES DUPAUL
 QUÉBEC



Modifications

2-	TEL QUE CONSTRUIT	JAN. 1995
2-	TEL QUE CONSTRUIT	JAN. 1995
1-	REVISÉ	MAI 1993
1-	REVISED	MAY 1993

DESSAU Les Consultants
 Dessau Inc.

A: n. du détail	A: détail n.
B: localisation	B: localisation
C: sur feuille n.	C: on sheet n.

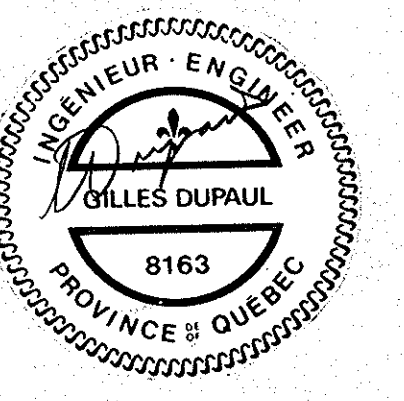
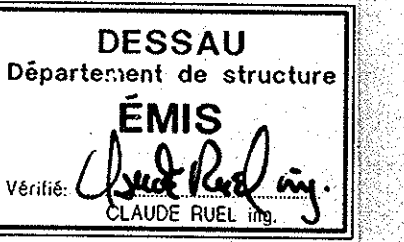
Dessiné par	Drawn by
Conçu par	Design by
Vérifié par	Checked by
Approuvé par	Approved by
Chargé du projet	Job captain
Chef de section	Section head
Gérant de secteur	Area manager

Nom du projet / Project title
AMÉNAGEMENT DE L'AIRE DE L'ÉCLUSE No.9
CANAL CHAMBLY - ST-JEAN, QUÉ

DEVELOPMENT OF LOCK No.9 AREA
 CHAMBLY CANAL - ST-JEAN, QUE.

Date	Dessau proj. no.	feuille
AOUT/AUG. 85	3864	14
Echelle	Scale	35
N. de référence	Reference n.	Sheet
131/09/PR.1-5		

S-14/35 Proj. 3864
 AMÉNAGEMENT ÉCLUSE No.9



Modifications

2- TEL QUE CONSTRUIT JAN. 1995
 2- TEL QUE CONSTRUIT JAN. 1995
 1- REVISE MAI 1993
 1- REVISED MAY 1993

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Dessiné par **P. DUPRAS** Drawn by
 Conçu par **G. DUPAUL** Design by

Vérifié par **C. RUEL** Checked by

Approuvé par **[Signature]** Approved by

Chargé du projet **RICHARD LAROUCHE** Job captain

Chef de Section **ALBERT NOLLET** Section head

Gerant de secteur **RICHARD LAROUCHE** Area manager

Nom du projet **AMENAGEMENT DE L'ARE DE L'ECLOSE No.9** Project title

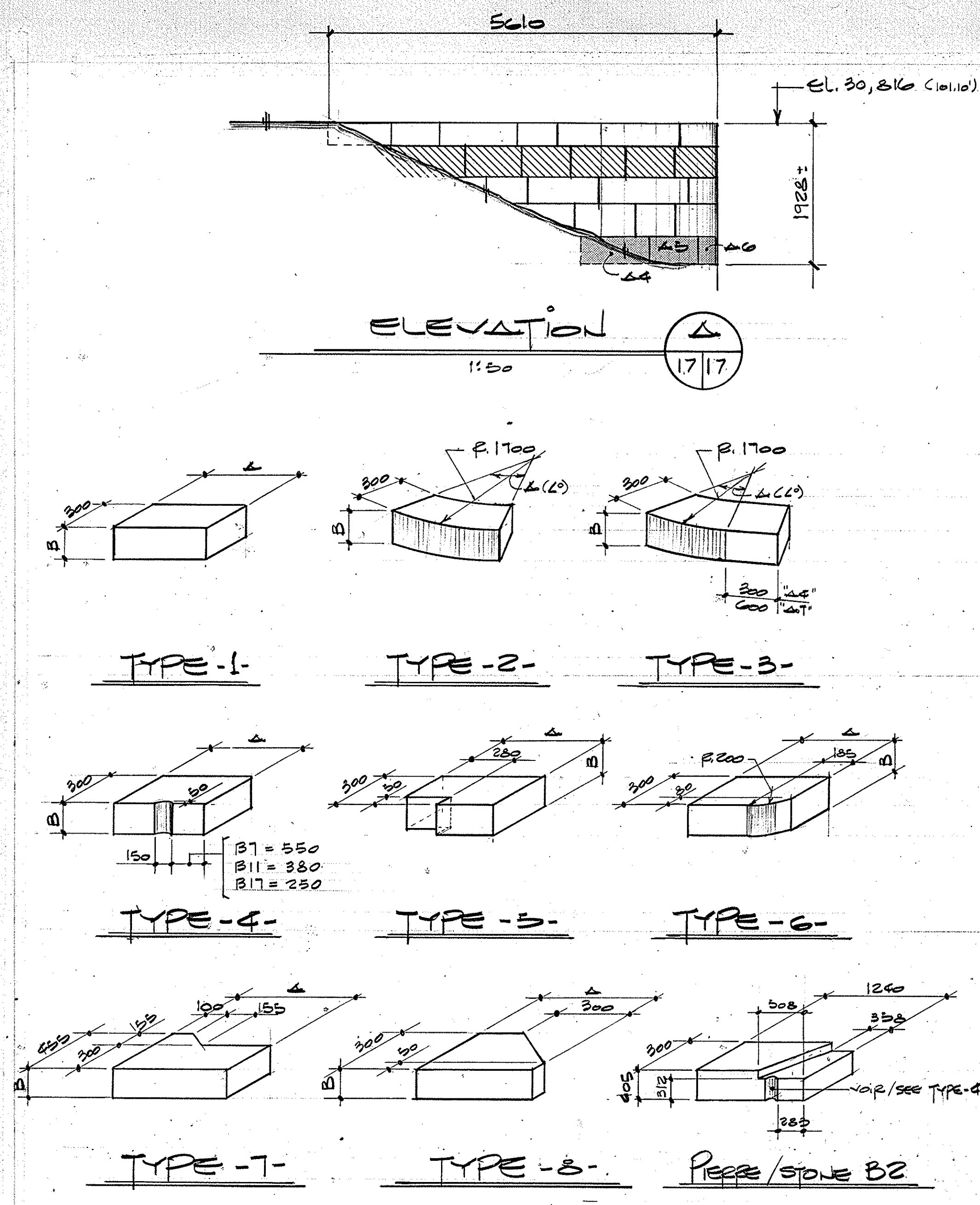
AMENAGEMENT DE L'ARE DE L'ECLOSE No.9
CANAL CHAMBLY - ST-JEAN, QUÉ

DEVELOPMENT OF LOCK No.9 AREA
CHAMBLY CANAL - ST-JEAN, QUE.

Titre du dessin **AMENAGEMENT DE L'ARE DE L'ECLOSE No.9** Drawing title

MUR EST PARTIE AVAL
 PLAN et ELEVATION
RECONSTRUCTION
 RECONSTRUCTION
 PLAN and ELEVATION
 EAST WALL LOWER PART

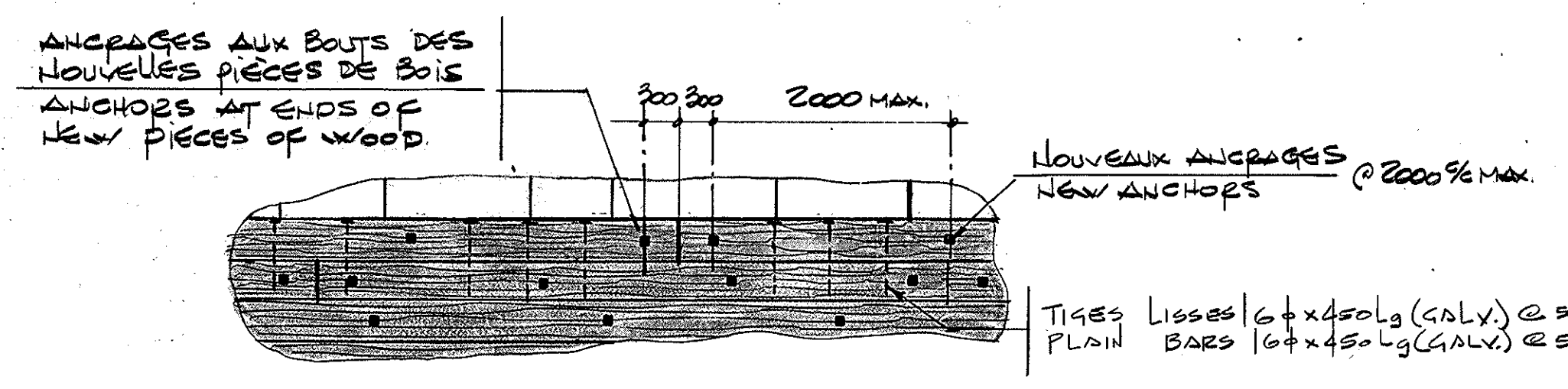
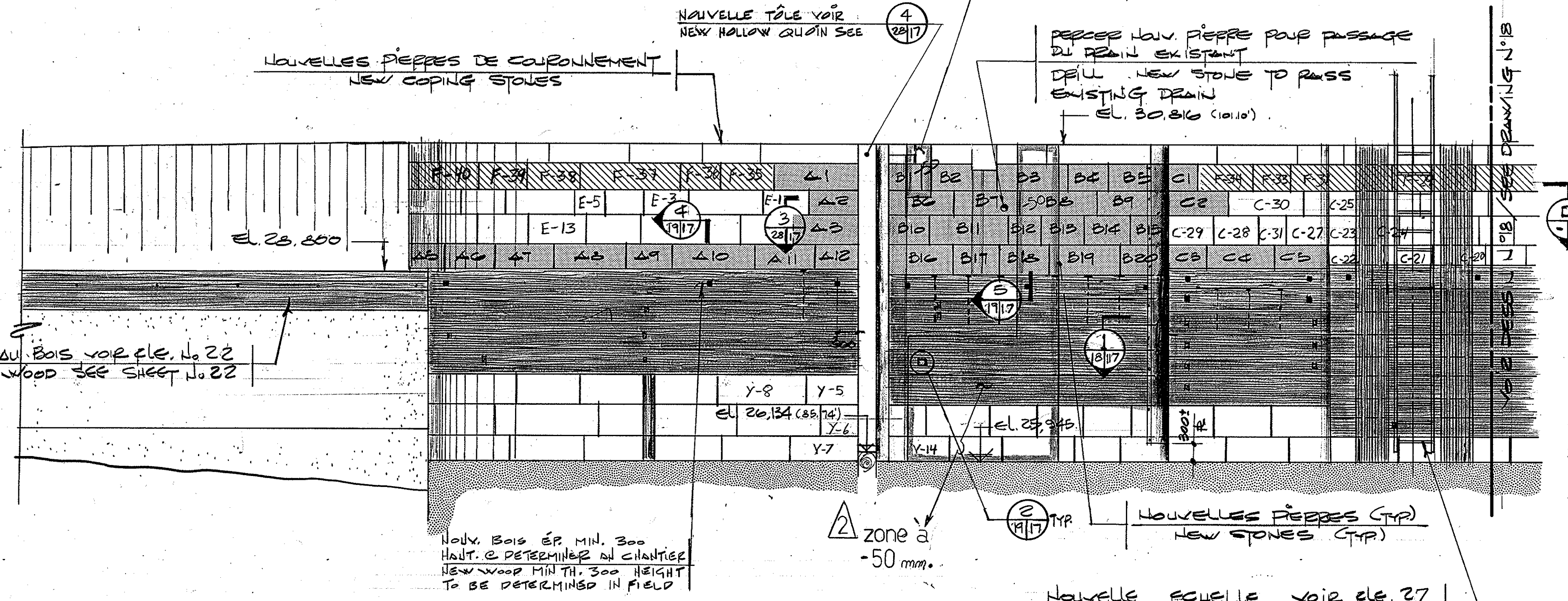
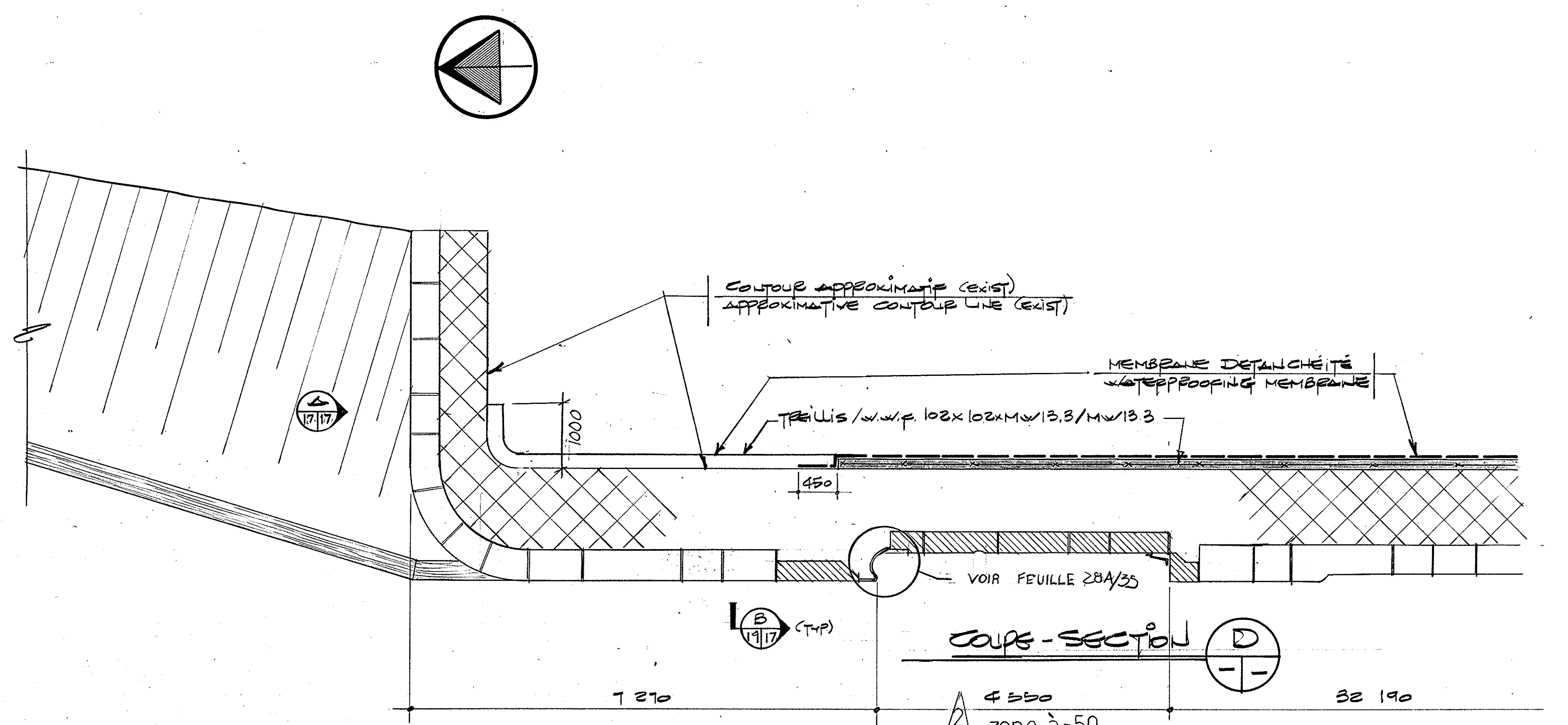
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 Echelle **1:50** Scale
 N. de référence **131/09/PR.1-5** Reference n.
 Sheet



PIERRE no. / STONE no.	DIMENSIONS		TYPE
	A	B	
A1	1320	385	8
A2	770	365	8
A3	1000	455	8
A4	(240)	370	3
A5	(230 30')	370	2
A6	(30')	370	2
A7	(11')	370	3
A8	1110	370	1
A9	690	370	1
A10	1250	370	1
A11	920	370	1
A12	650	370	8
C1	450	395	7
C2	950	360	7
C3	600	380	7
C4	1050	380	1
C5	780	380	6

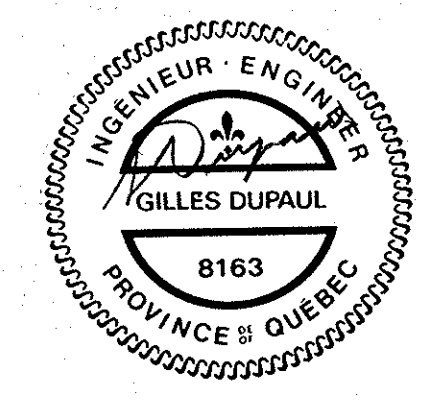
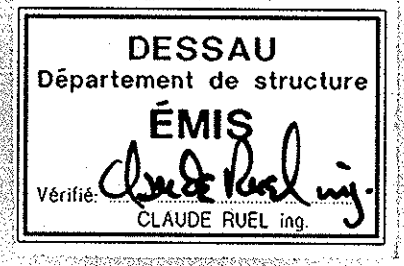
PIERRE no. / STONE no.	DIMENSIONS		TYPE
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B5	860	405	1
B6	1010	360	5
B7	1000	360	4
B8	1200	360	1
B9	1100	360	1
B10	630	450	5
B11	1210	450	4
B12	500	450	1
B13	665	450	1
B14	700	450	1
B15	580	450	1
B16	1000	430	5
B17	710	430	4
B18	750	430	1
B19	1105	430	1
B20	730	430	1

NOTE: FINIR ENTIEREMENT LES FACES APPARENTES DES PIERRES DE FACADE A LA BOUCHARDRE
 FINISH ENTIRELY EXPOSED FACES OF STONES WITH A BRUSH HAMMER.



DÉTAIL NOU. ANCRAGES DANS NOU. BOIS
 DETAIL OF NEW ANCHORS IN NEW WOOD

1° RANG DE PIERRES SOUS PIERRES DE COUPEMENT A REMPLACER
 LONGUEURS ET HAUTEURS A DETERMINER AU CHANTIER PENDANT LES TRAVAUX (TYPES 1-2 ou 3)
 1° ROW OF STONES UNDER COPING STONES TO BE REPLACED
 LENGTHS AND HEIGHTS TO BE DETERMINED IN FIELD DURING WORKS (TYPES 1-2 OR 3)



Modifications

2-	TEL QUE CONSTRUIT	JAN. 1995
2-	AS BUILT	JAN. 1995
1-	REVISÉ	MAI 1993
1-	REVISED	MAY 1993

DESSAU Les Consultants Dessau Inc.

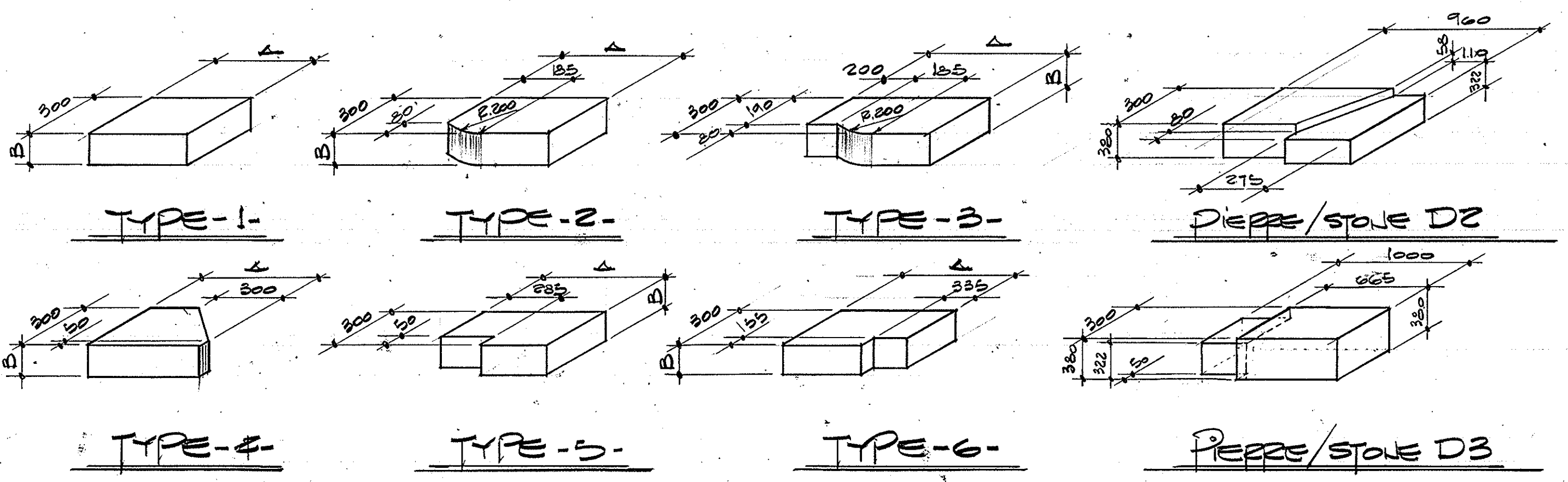
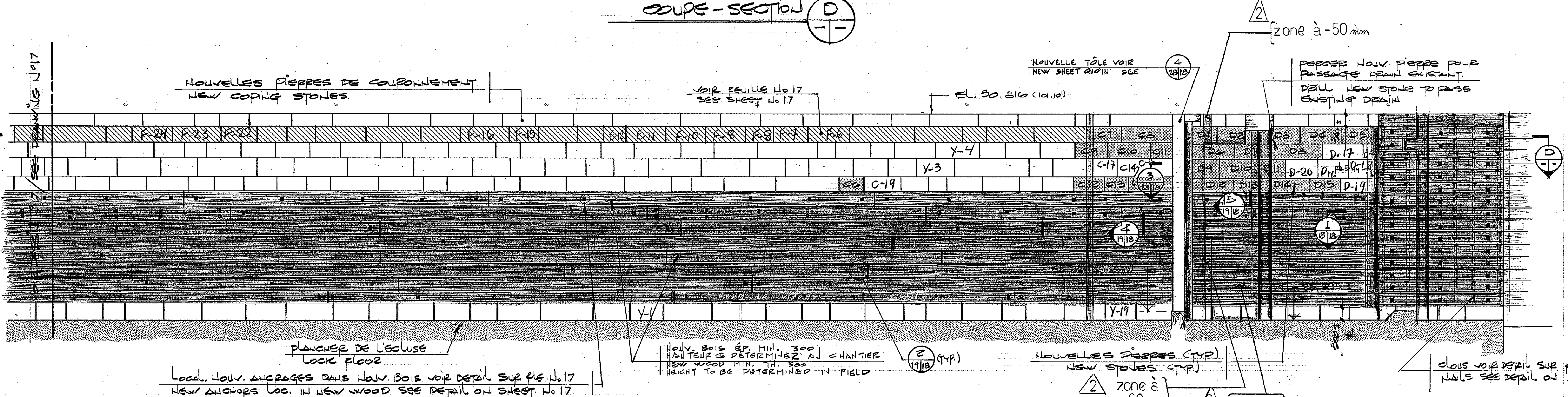
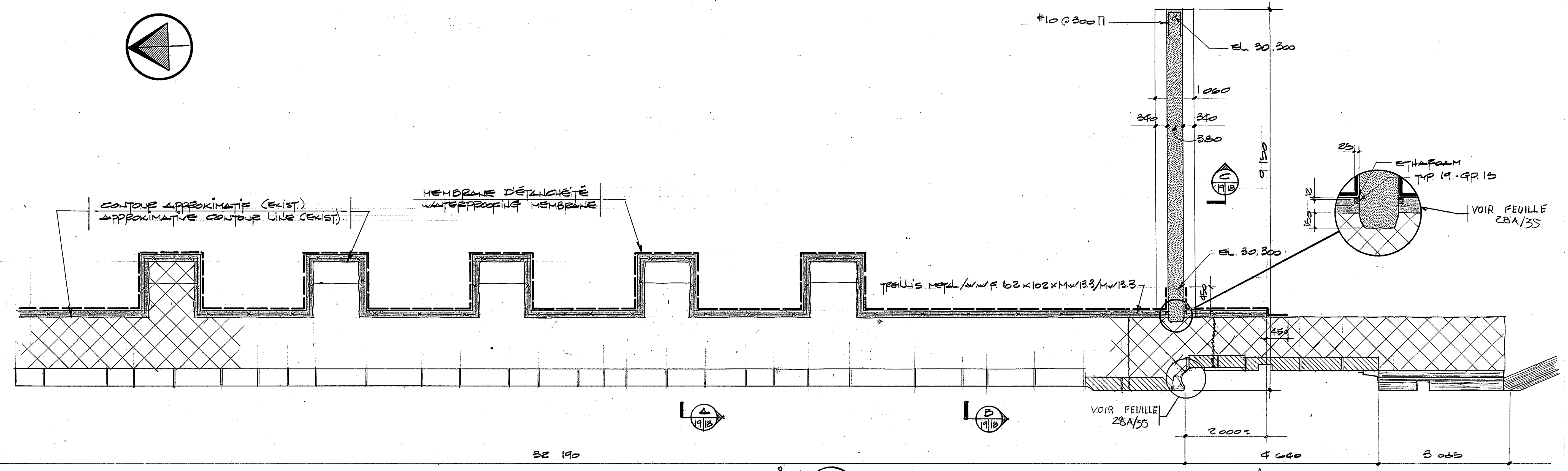
A: n. du détail A: detail n.
 B: localisation B: localisation
 C: sur feuille n. C: on sheet n.

Dessiné par **P. DUPRAS** Drawn by
 Conçu par **G. DUPAUL** Design by
 Vérifié par **C. RUEL** Checked by
 Approuvé par **[Signature]** Approved by
 Chargé du projet **RICHARD LAROUCHE** Job captain
 Chef de Section **ALBERT NOLLET** Section head
 Gérant de secteur **RICHARD LAROUCHE** Area manager

Nom du projet **AMENAGEMENT DE L'AIRE DE L'ECLUSE No.9 CANAL CHAMBLY - ST-JEAN, QUÉ** Project title
DEVELOPMENT OF LOCK No.9 AREA CHAMBLY CANAL - ST-JEAN, QUE.

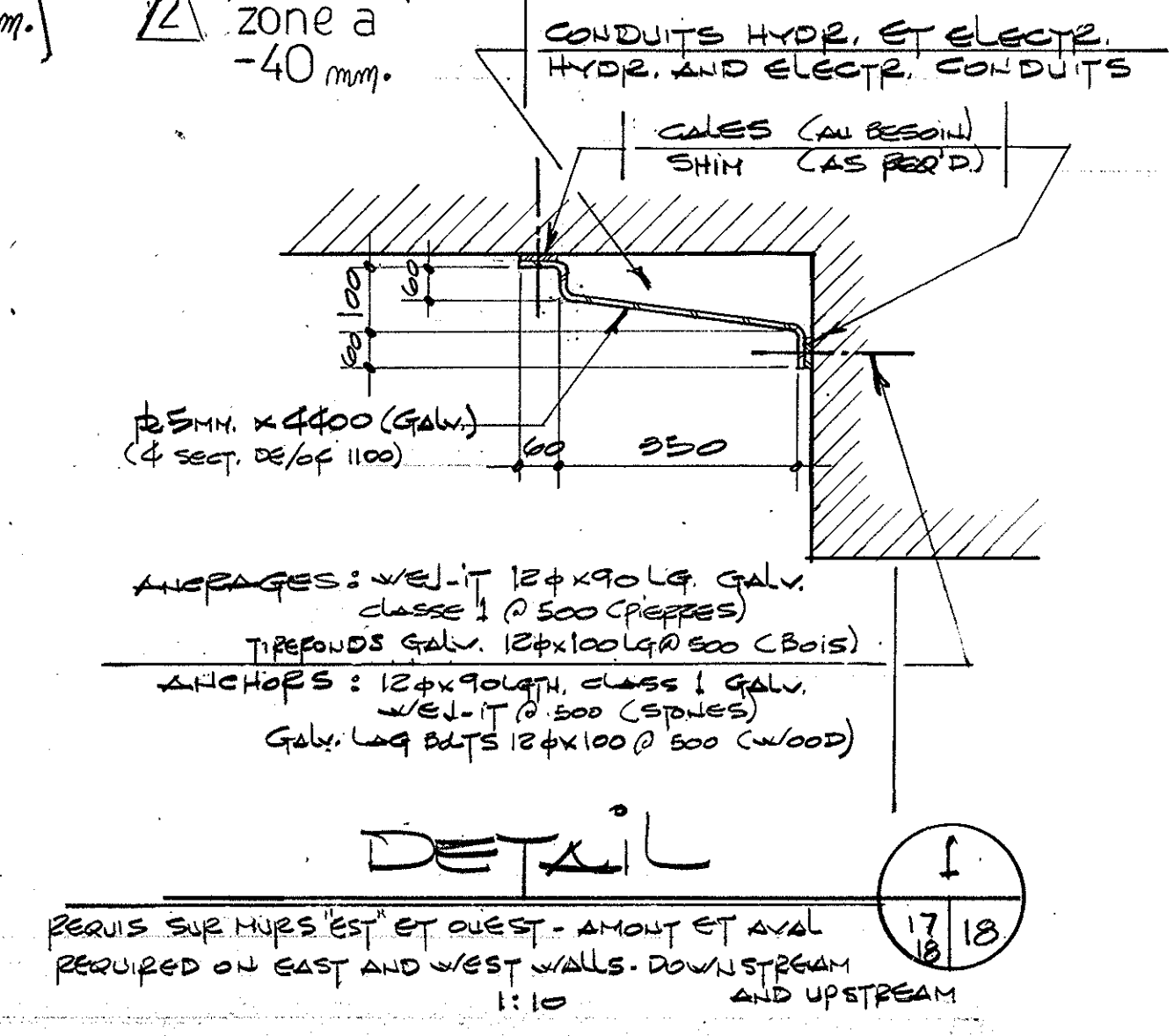
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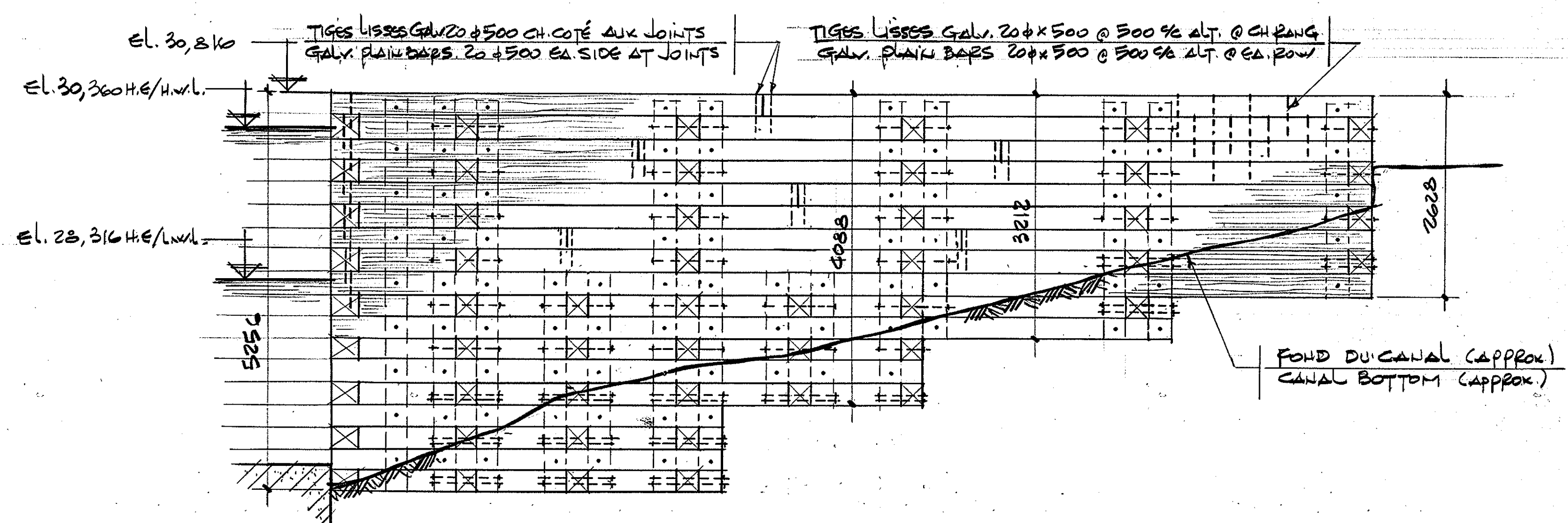
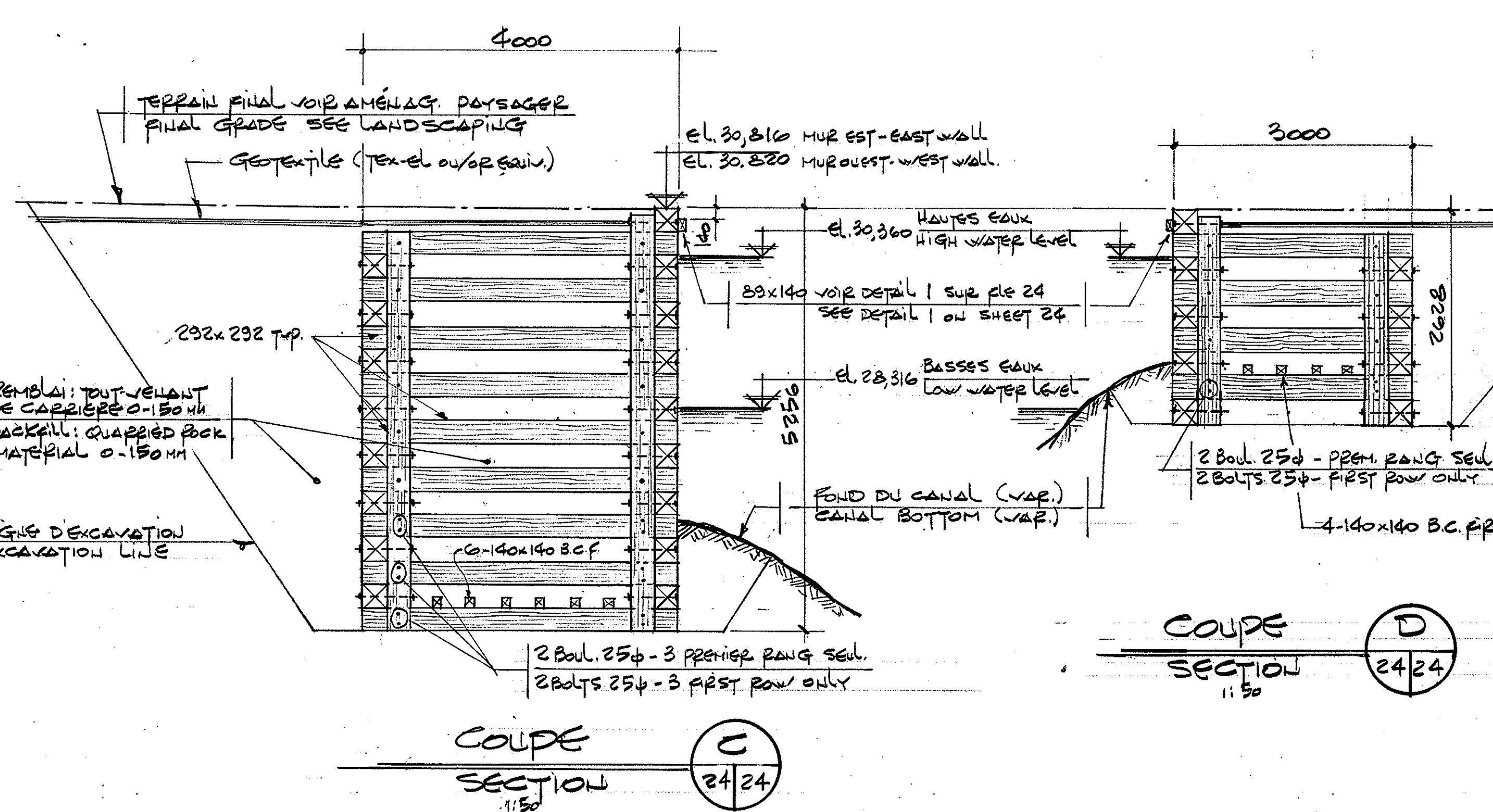
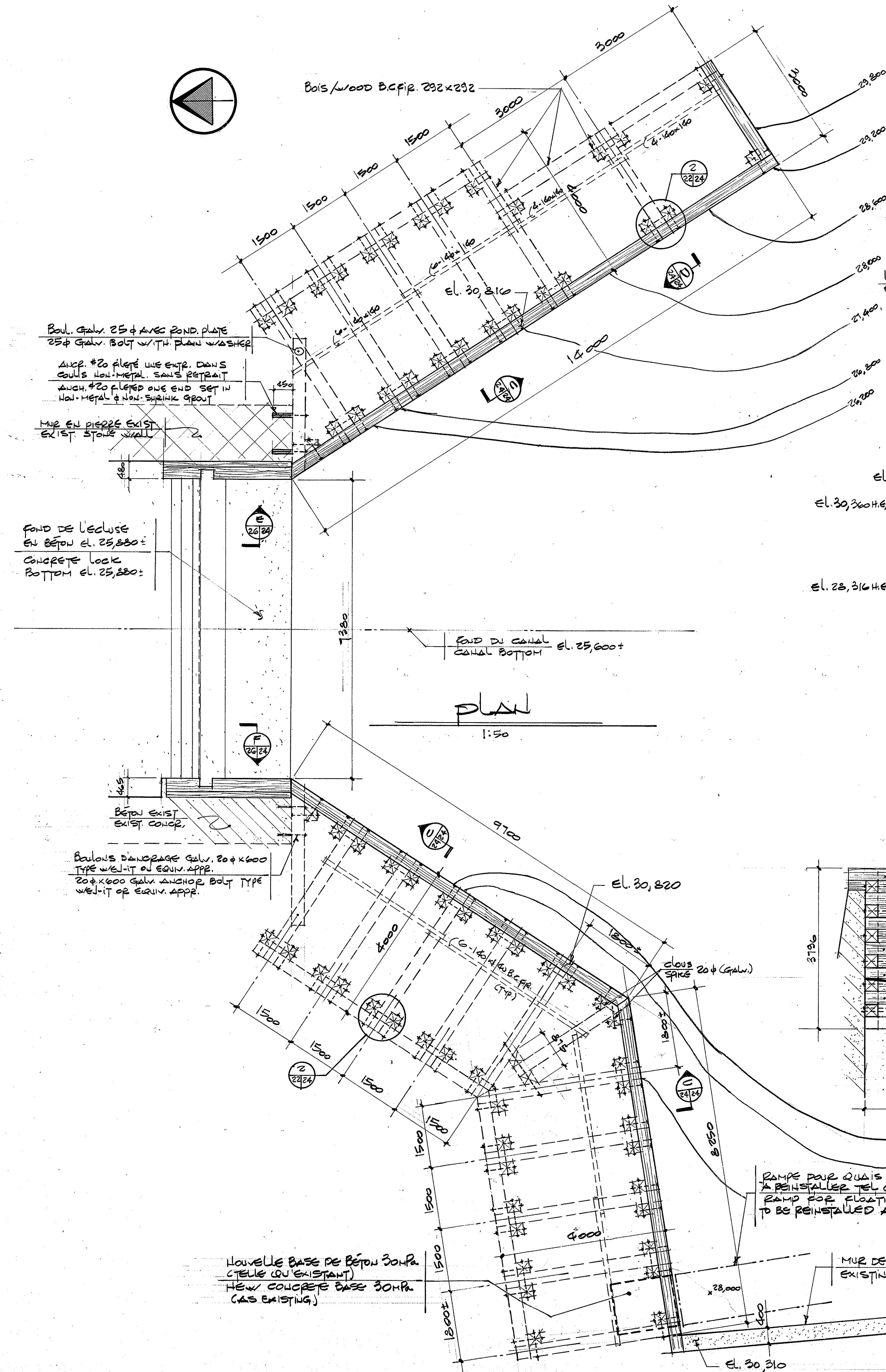
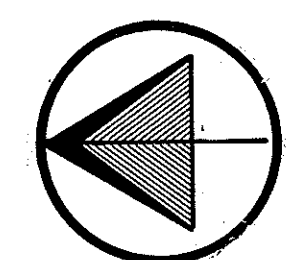
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 N. de référence **131/09/PR.1-5** Reference n.



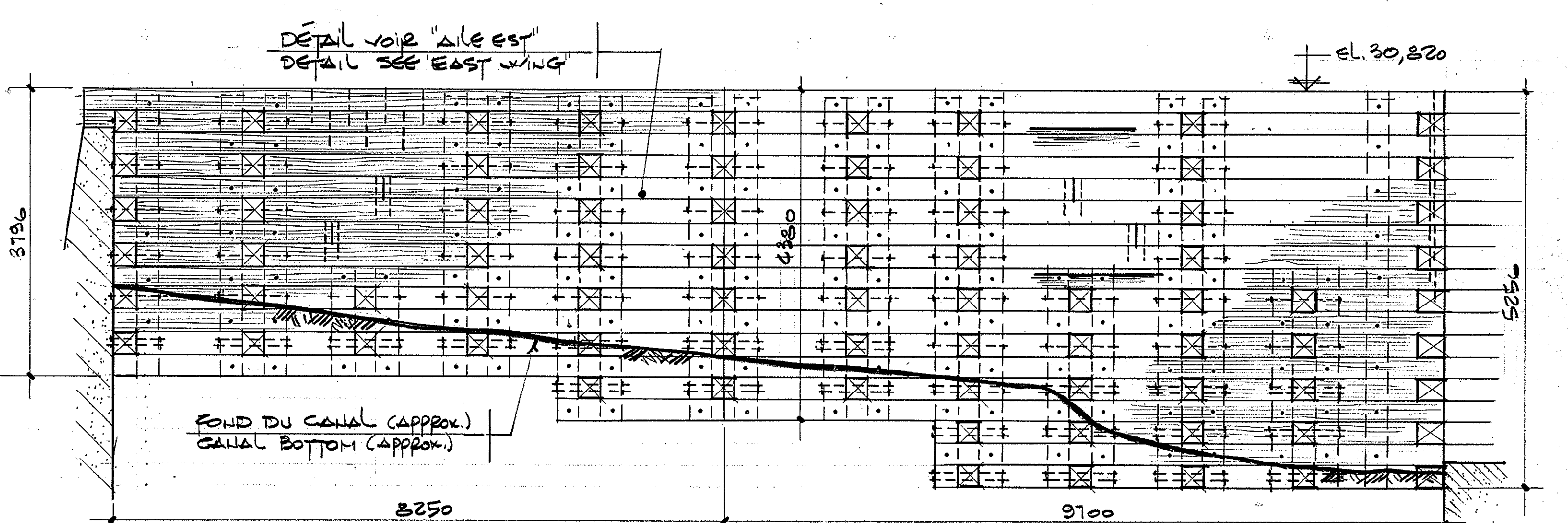
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C8	1200	380	4
C9	770	360	3
C10	550	360	1
C11	935	360	4
C12	640	310	3
C13	560	310	1
C14	1060	310	4

PIERRE no. / STONE no.	A	B	TYPE
D1	570	380	1
D2	voir / see detail		
D3	voir / see detail		
D4	970	380	1
D5	885	380	1
D6	960	360	5
D7	900	360	6
D8	1210	360	1
D9	630	470	5
D10	900	470	1
D11	580	470	6
D12	880	310	5
D13	985	310	6
D14	875	310	1
D15 *	630	310	1





ELEVATION MUR "AILE EST"
EAST WING WALL ELEVATION



ELEVATION MUR "AILE OUEST"
WEST WING WALL ELEVATION

Parcs Canada Parks Canada

DESSAU
Département de structure
EMIS
VERIFIÉ
CLAUDE RUEL

INGÉNIEUR-ÉLÉVATEUR
GILLES DUPAUL
8163
QUÉBEC

Modifications:

2-	TEL. QUE. CONSTRUIT	JAN. 1995
2-	AS BUILT	JAN. 1995
1-	REVISÉ	JAN. 1995
1-	REVISED	JAN. 1995

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B: localisation B: localisation
C: sur feuille n. C: on sheet n.

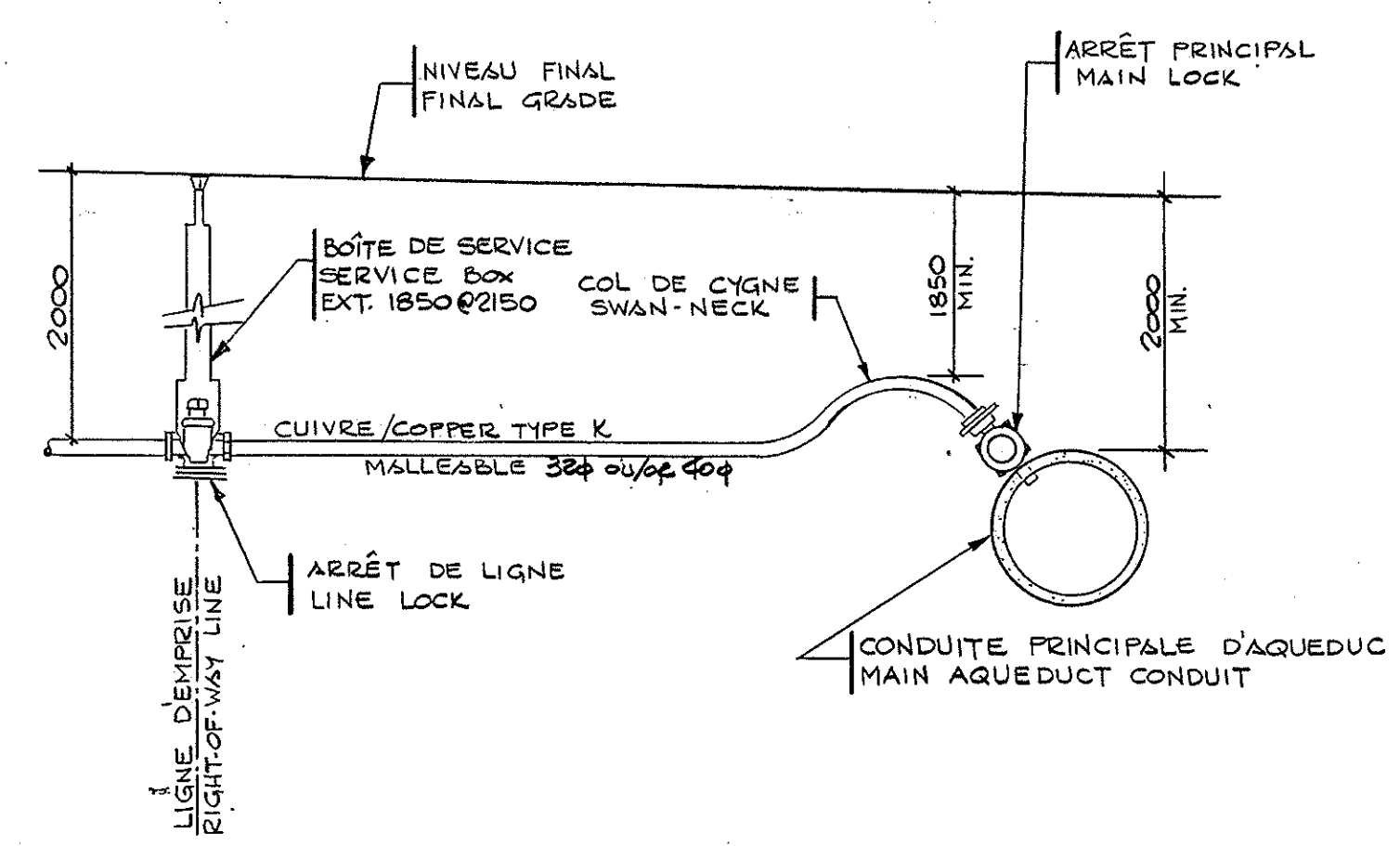
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Conçu par G. DUPAUL / Design by
Vérifié par C. RUEL / Checked by
Approuvé par / Approved by
Chargé du projet RICHARD LAROCHE / Job captain
Chef de Station ALBERT NOLLET / Section head
Gérant de bureau RICHARD LAROCHE / Area manager

Nom du projet AMENAGEMENT DE L'AIRE DE L'ECLUSE No.9
Project title DEVELOPMENT OF LOCK No.9 AREA
CHAMBLY CANAL - ST-JEAN, QUE.

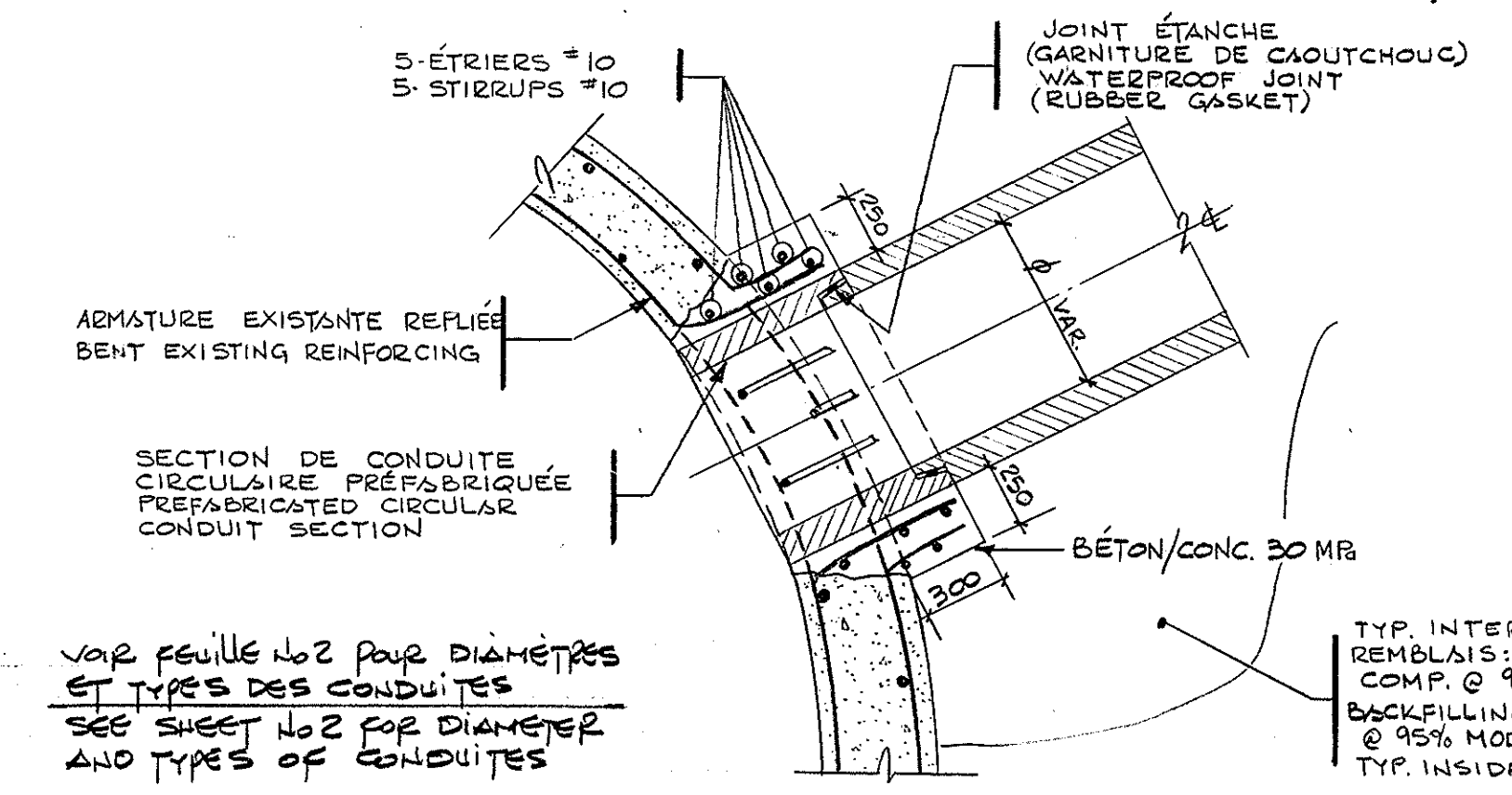
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Drawing title DEVELOPMENT OF LOCK No.9 AREA
CHAMBLY CANAL - ST-JEAN, QUE.

NOUVEAUX MURS
AILES AMONT EST ET OUEST
UPPER EAST AND WEST WINGS
NEW WALLS

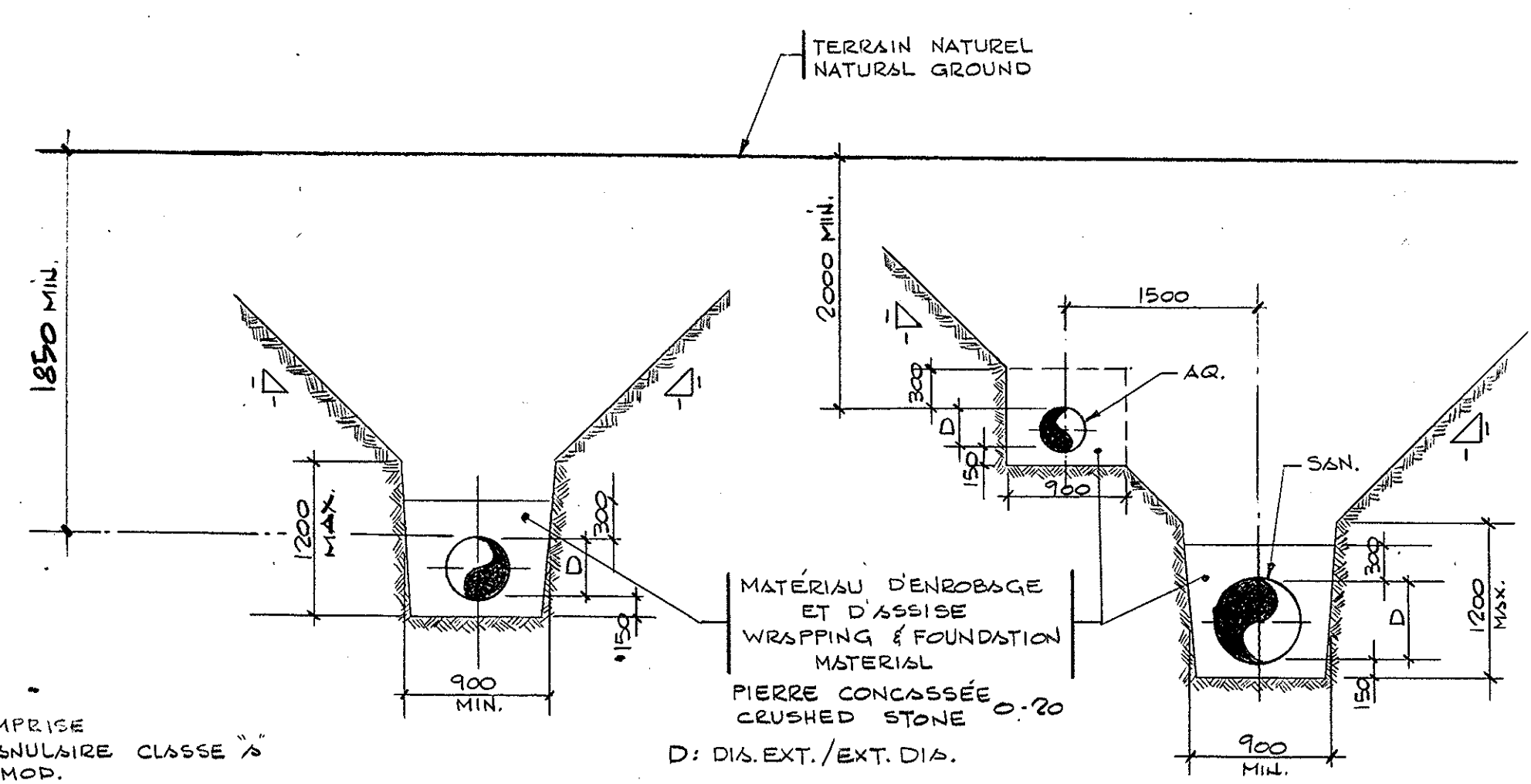
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Echelle	Scale	
1:50		
N. de référence	Reference n.	
131/09/PR.1-5		



RACCORDEMENT DES ENTRÉES D'AQUEDUC
AQUEDUCT ENTRY CONNECTION
(voir vue en plan feuille No 2 - see plan view sheet No 2)

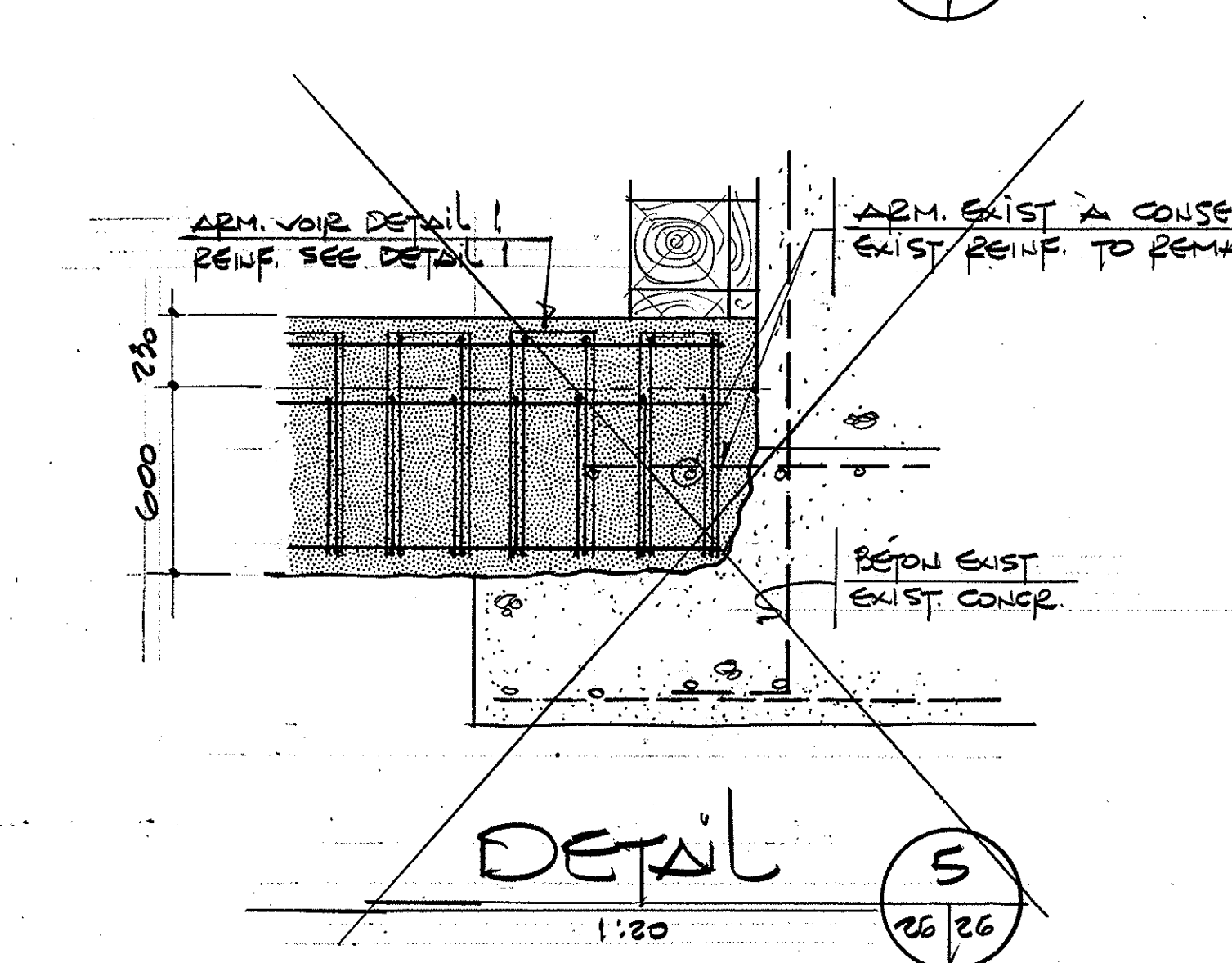
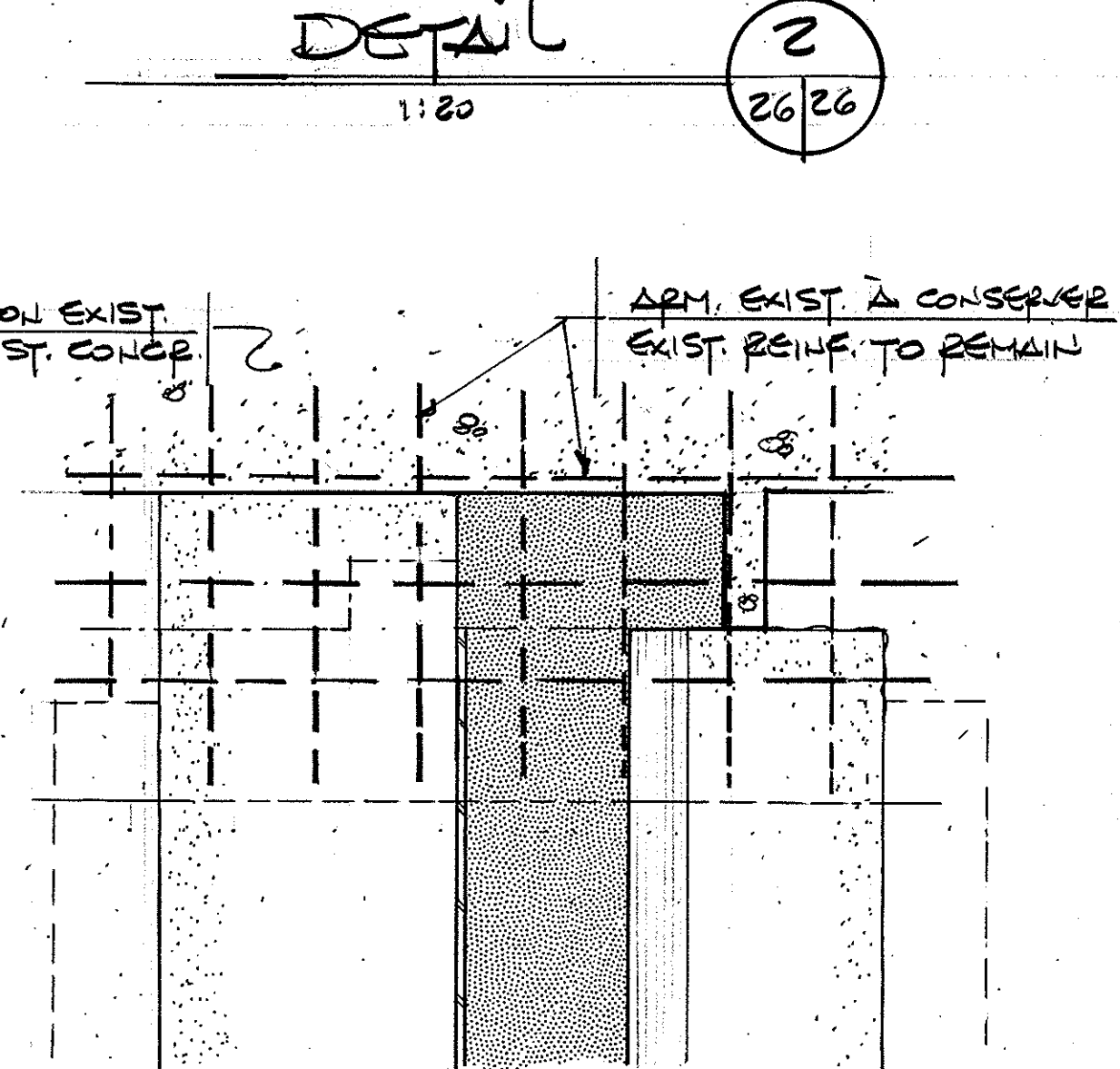
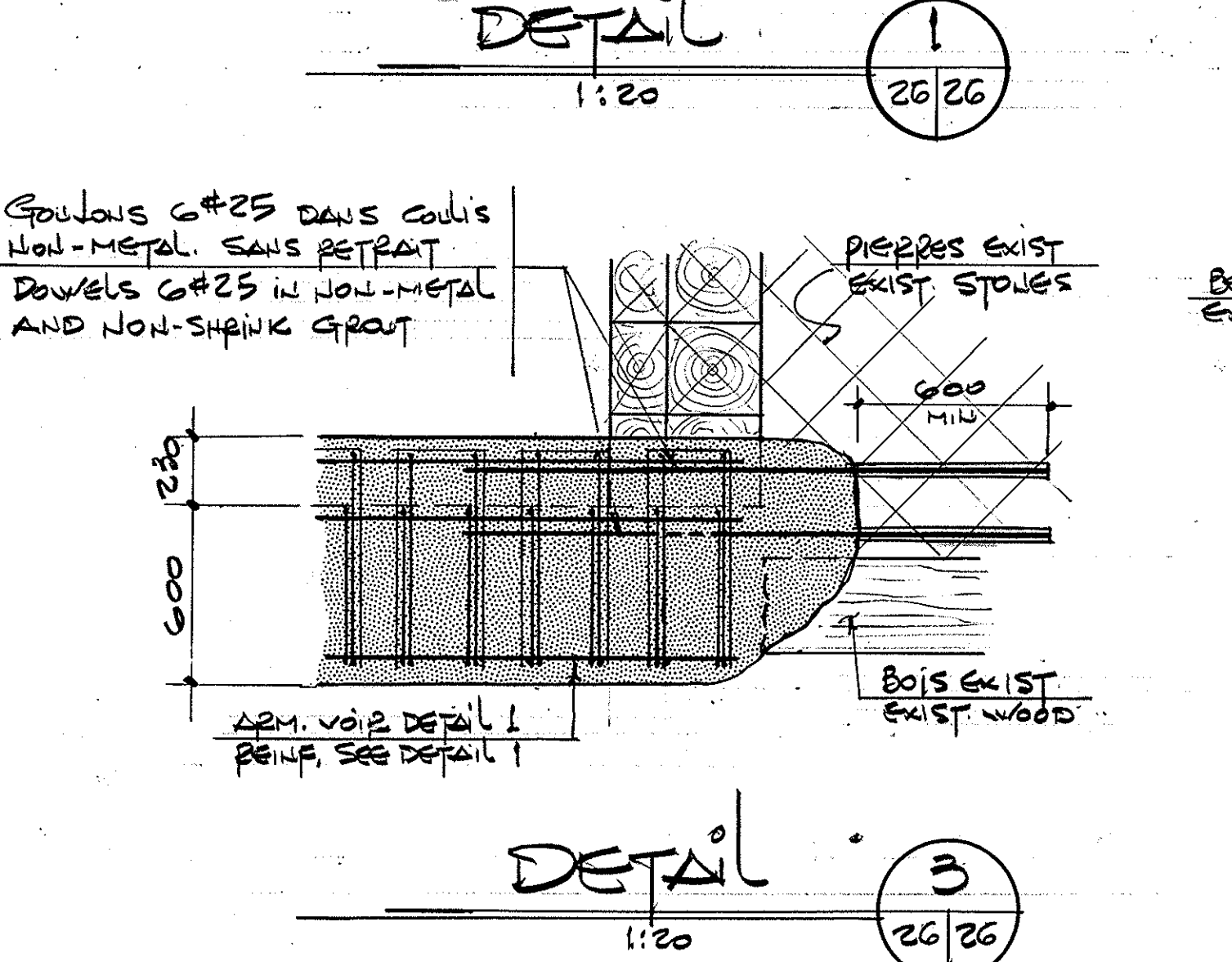
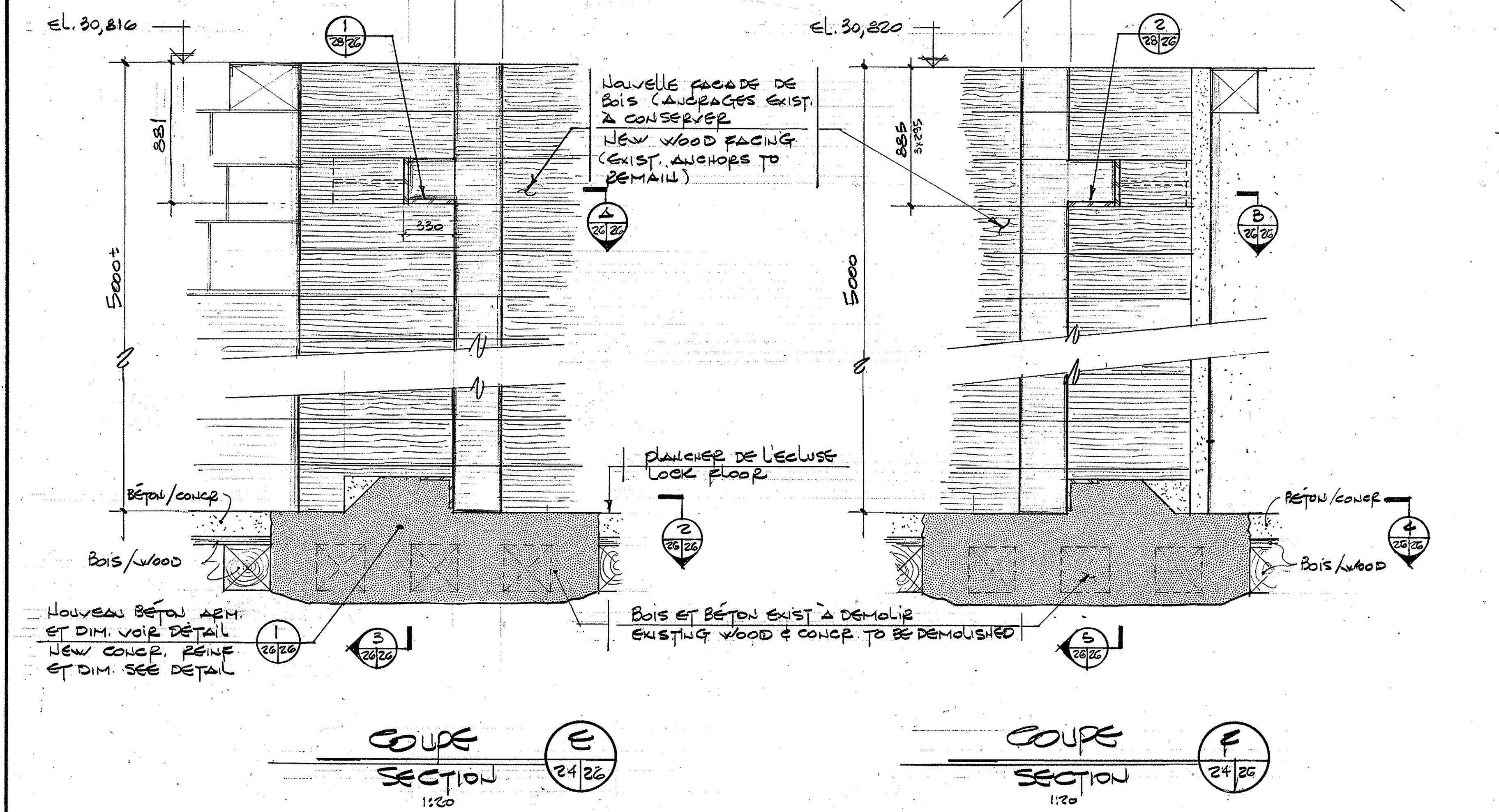
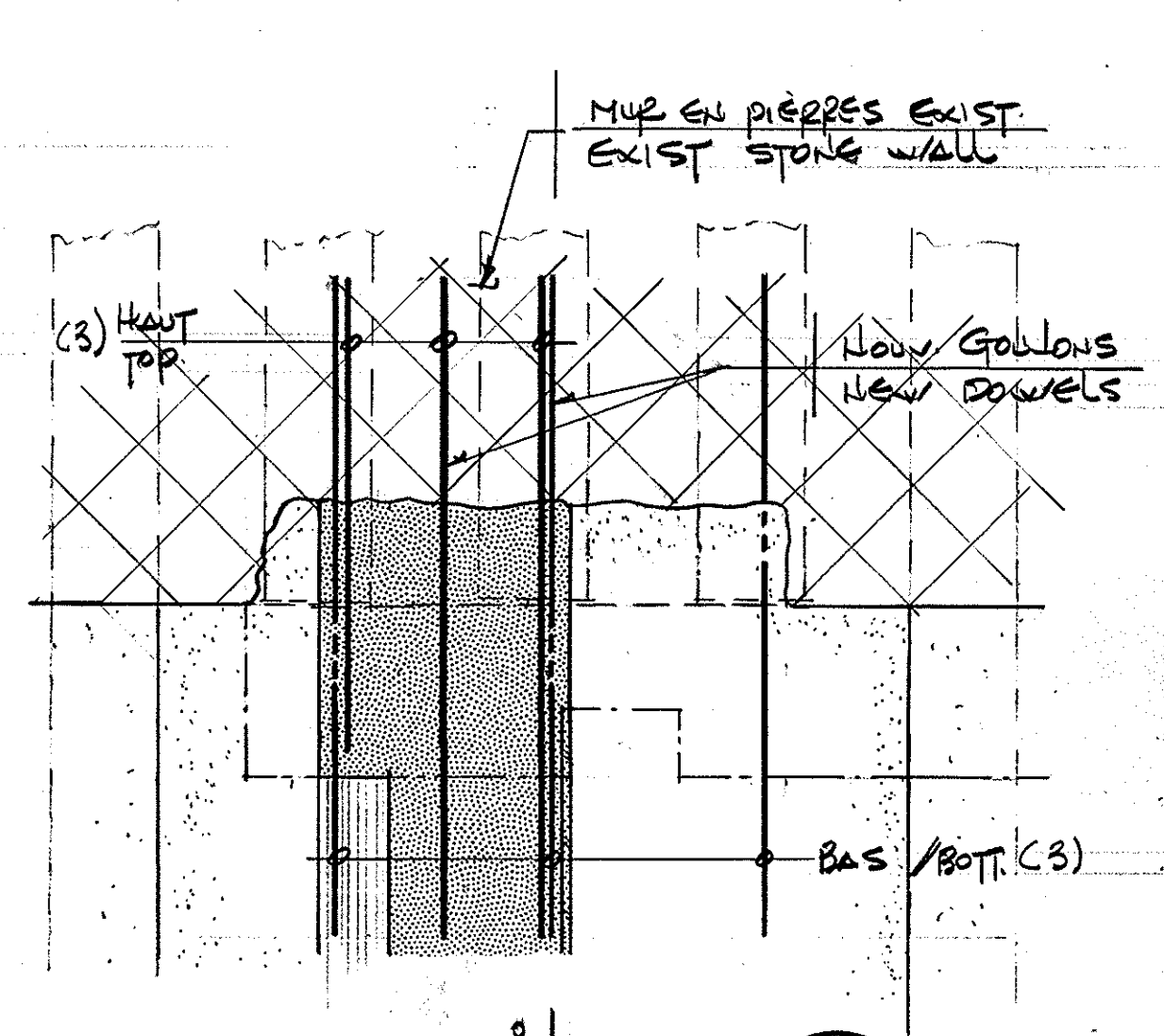
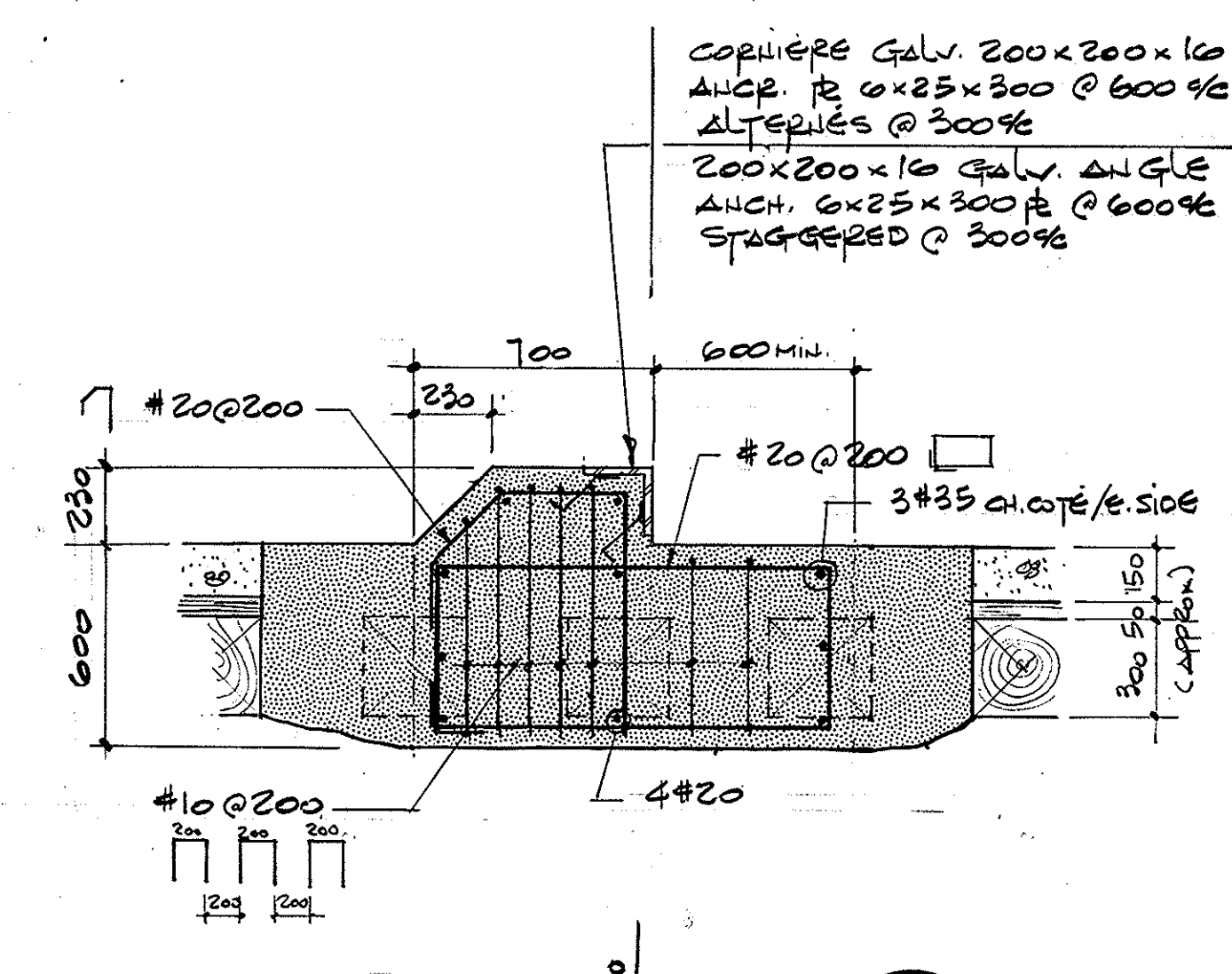
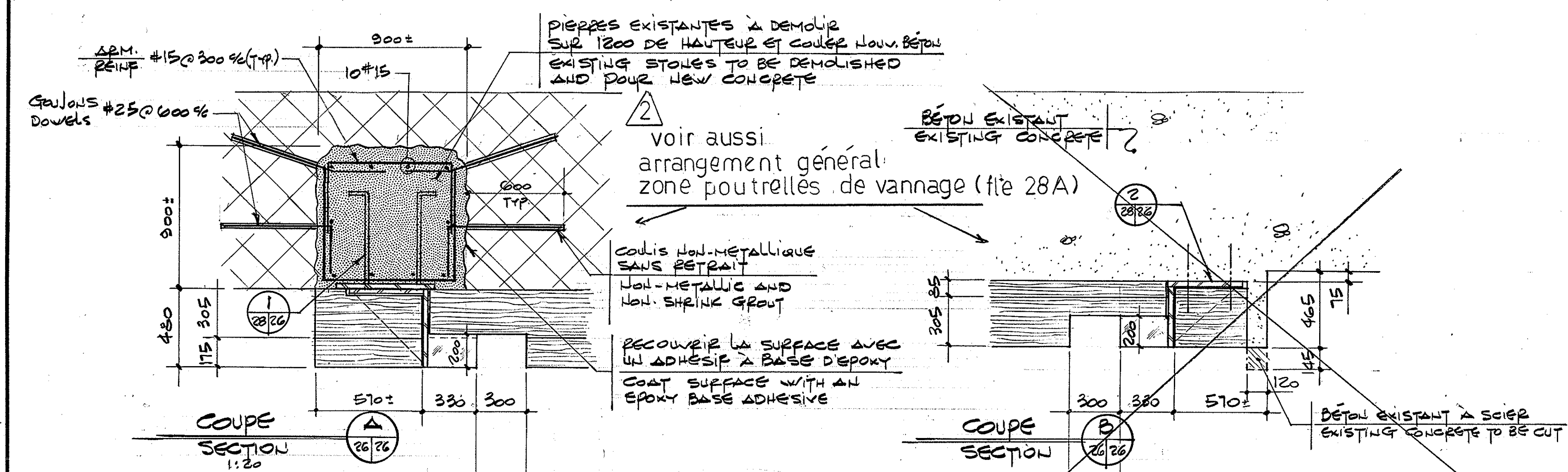


RACCORDEMENT D'UNE CONDUITE SUR UNE
CONDUITE EXISTANTE EN FER À CHEVAL
CONNECTION OF A CONDUIT ON AN EXISTING
HORSESHOE CONDUIT



SIMPLE - SINGLE COMBINÉE - COMBINED

TRANCHÉES - TRENCHES
(voir vue en plan feuille No 2 - see plan view sheet No 2)



Modifications

2-	TEL QUE CONSTRUIT	JAN. 1995
2-	AS BUILT	JAN. 1995
1-	REVISE	MAY 1993
1-	REVISED	MAY 1993

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B: localisation	B: localisation
C: sur feuille n.	C: on sheet n.

Dessiné par	Drawn by
L. COSETTE - P. DUPRAS	
Conçu par	Design by
G. DUPAUL	
Vérifié par	Checked by
C. RUEL	
Approuvé par	Approved by
[Signature]	
Chargé du projet	Job captain
RICHARD LAROCHE	
Chef de Section	Section head
ALBERT NOLLET	
Gérant de secteur	Area manager
RICHARD LAROCHE	
Nom du projet	Project title

AMENAGEMENT
DE L'AIRE DE L'ÉCLUSE No.9
CANAL CHAMBLY - ST-JEAN, QUÉ

DEVELOPMENT
OF LOCK No.9 AREA
CHAMBLY CANAL - ST-JEAN, QUÉ.

Titre du dessin Drawing title

DETAILS
DETAILS

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Echelle	Scale	35
IND.		Sheet
N. de référence	Reference n.	
131/09/PR.1-5		

S-26/35 Proj. 3864
- AMENAGEMENT ECLUSE No.9 -

Modifications

2- TEL QUE CONSTRUIT JAN. 1995
2- AS BUILT JAN. 1995
1- REVISÉ MAI 1993
1- REVISED MAY 1993

Dessau Inc.
3015, rue St-Jacques, Québec, Québec G1S 4G1
TÉLÉPHONE: (514) 384-1000

DESSAU

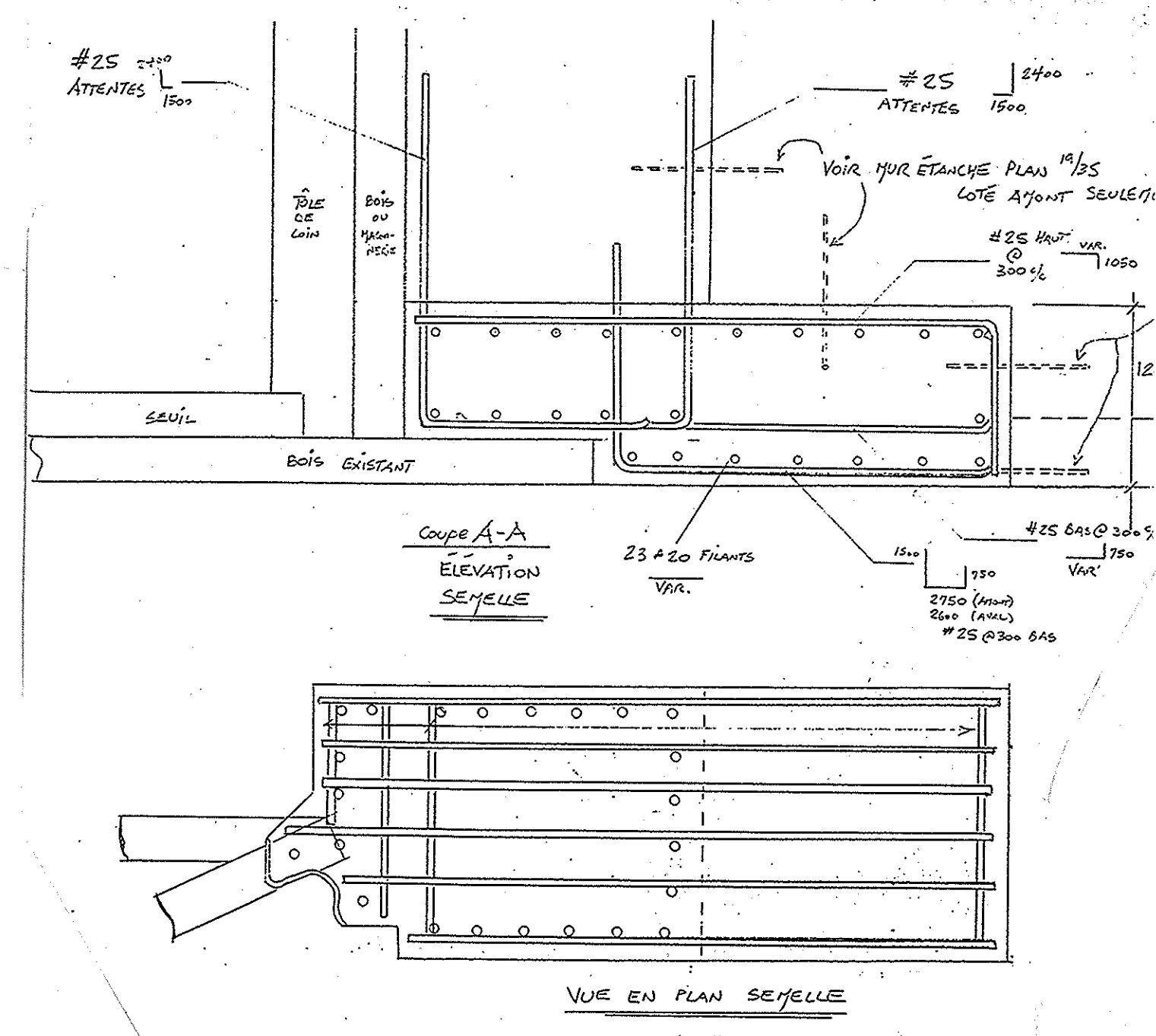
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Dessiné par: PIERRE DUPRAS
Conçu par: DANIEL TOUTANT
Vérifié par: C. RUEL
Approuvé par: DANIEL TOUTANT
Charge de projet: RICHARD LAROCHE
Chef de section: ALBERT NOLLET
Garant de secteur: RICHARD LAROCHE
Nom du projet: AMENAGEMENT DE L'AIRE DE L'ÉCLUSE No.9
CANAL CHAMBLY - ST-JEAN, QUÉ.

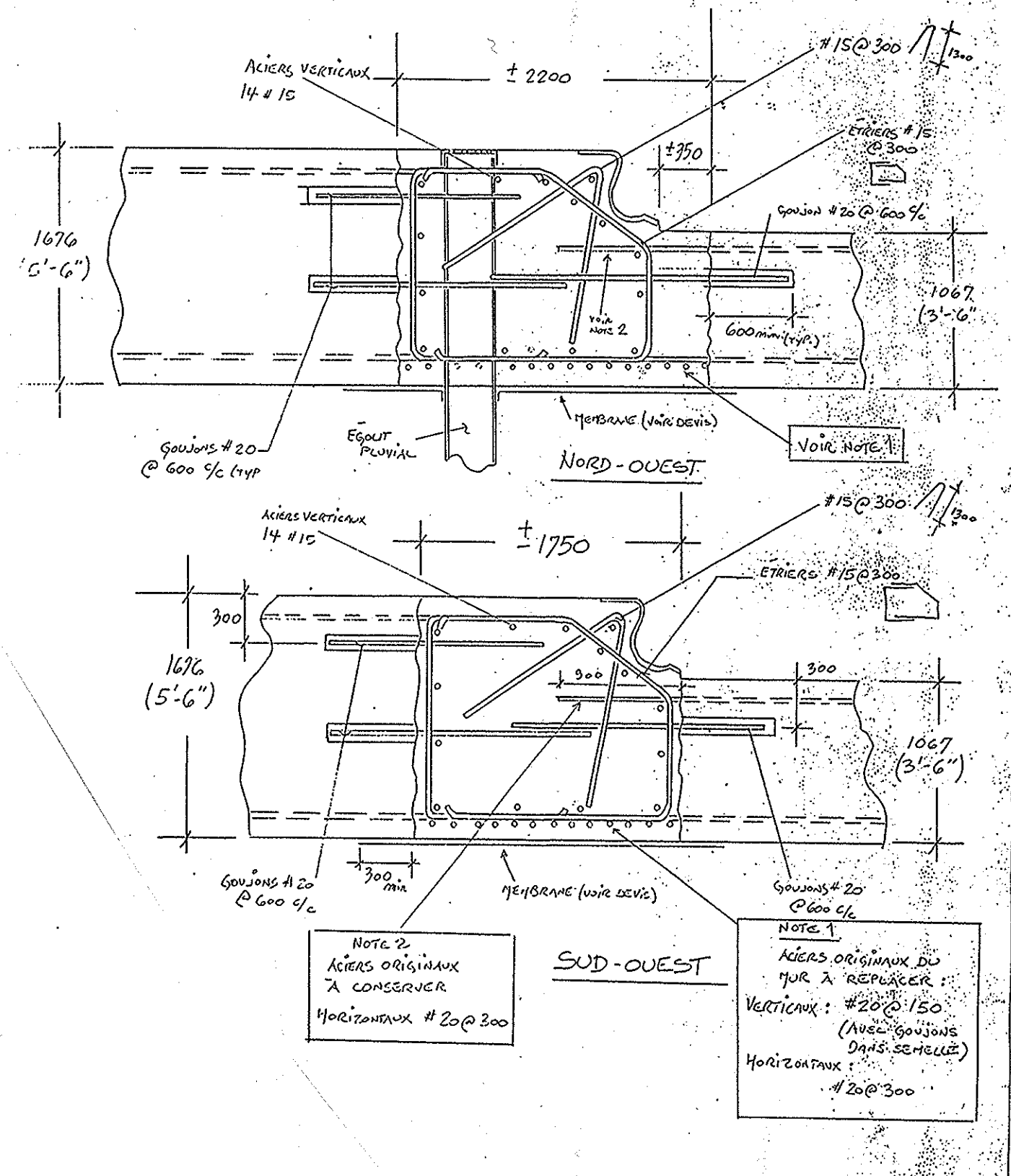
DEVELOPMENT OF LOCK No.9 AREA
CHAMBLY CANAL - ST-JEAN, QUÉ.

Titre du dessin: MUR DE MAÇONNERIE "SUPPORT DES TABLETTES"
Drawing title: DETAILS

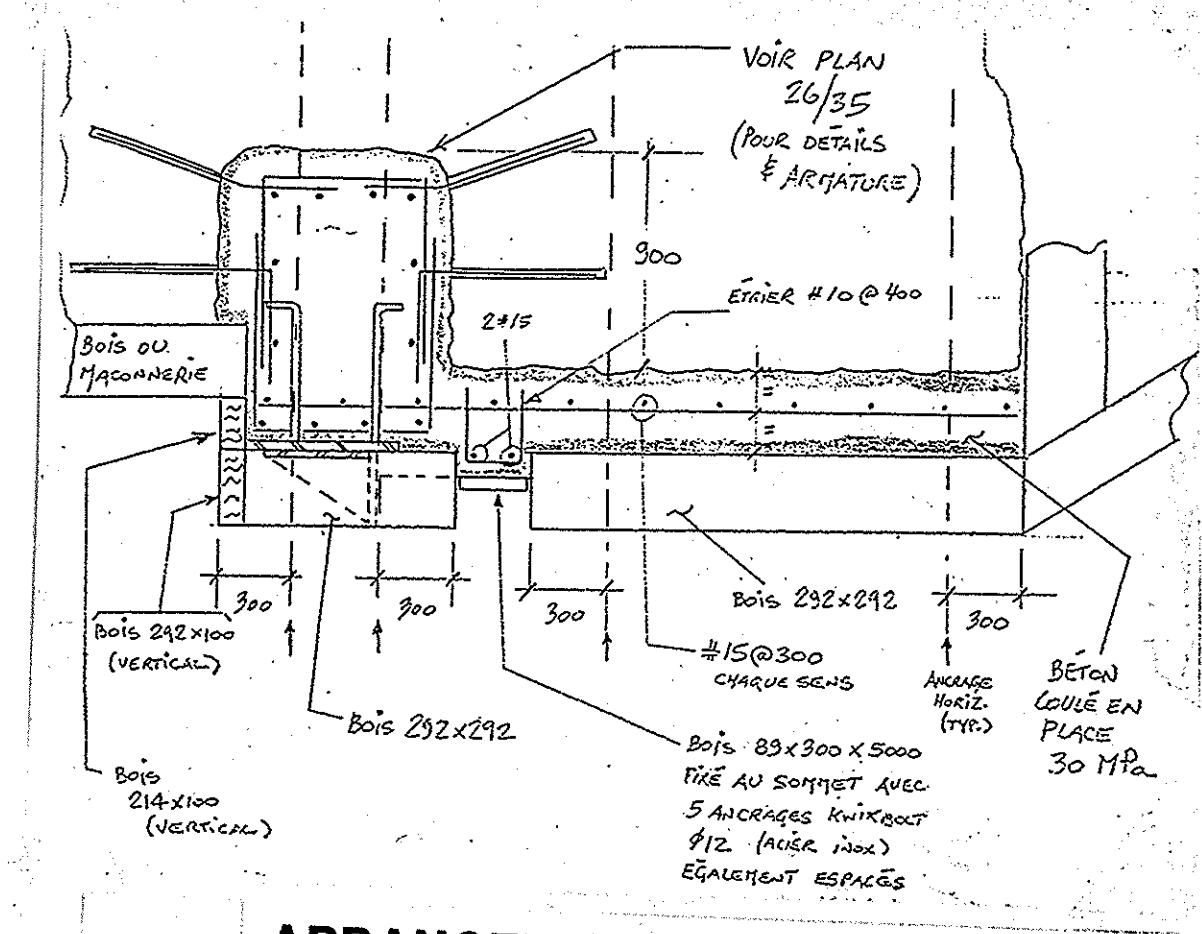
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feuille: 28A
35
Sheet



TOILES DE COIN COTE "EST"
RECONSTRUCTION SEMELLE

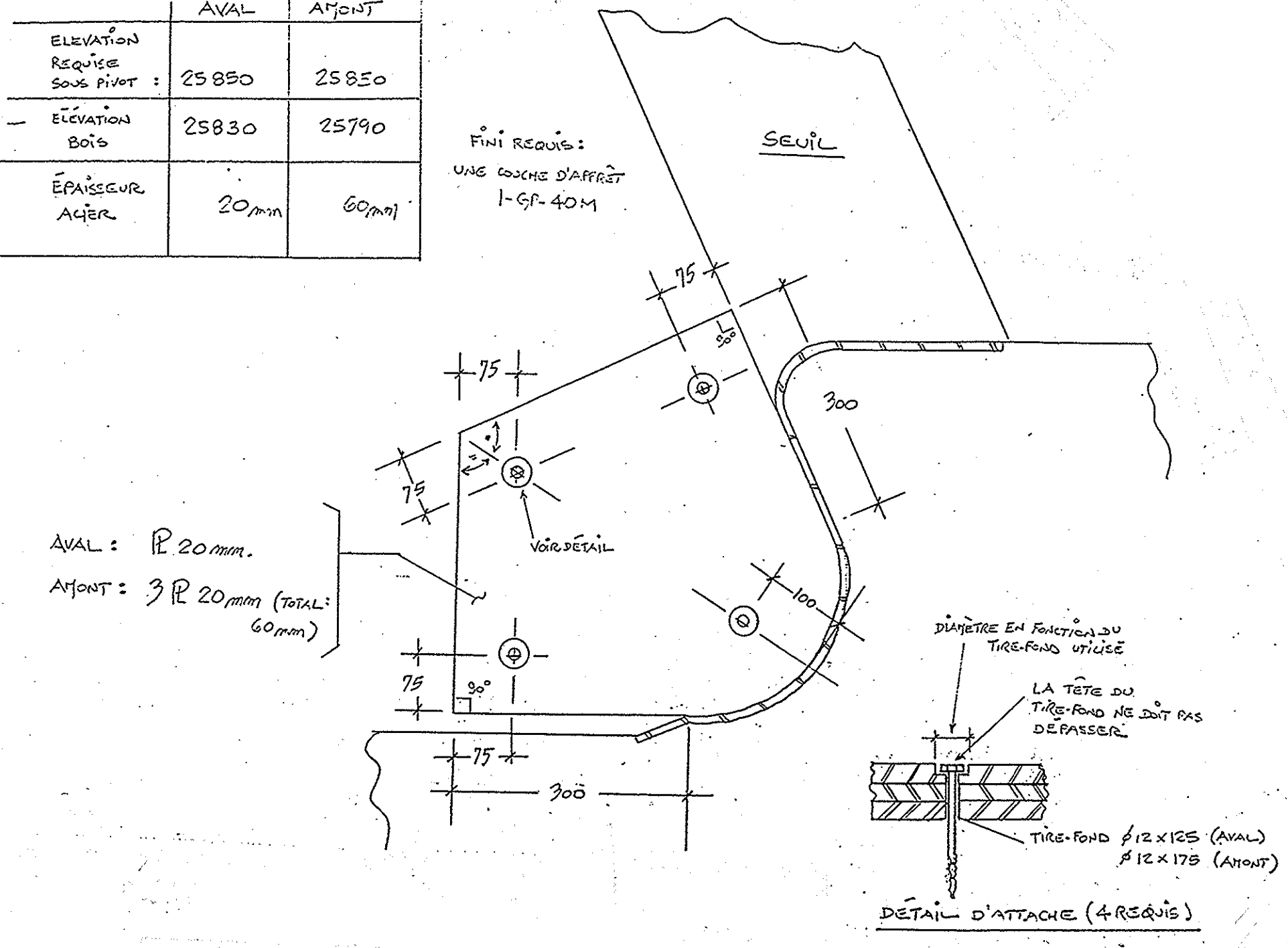


TOILES DE COIN COTE "OUEST"



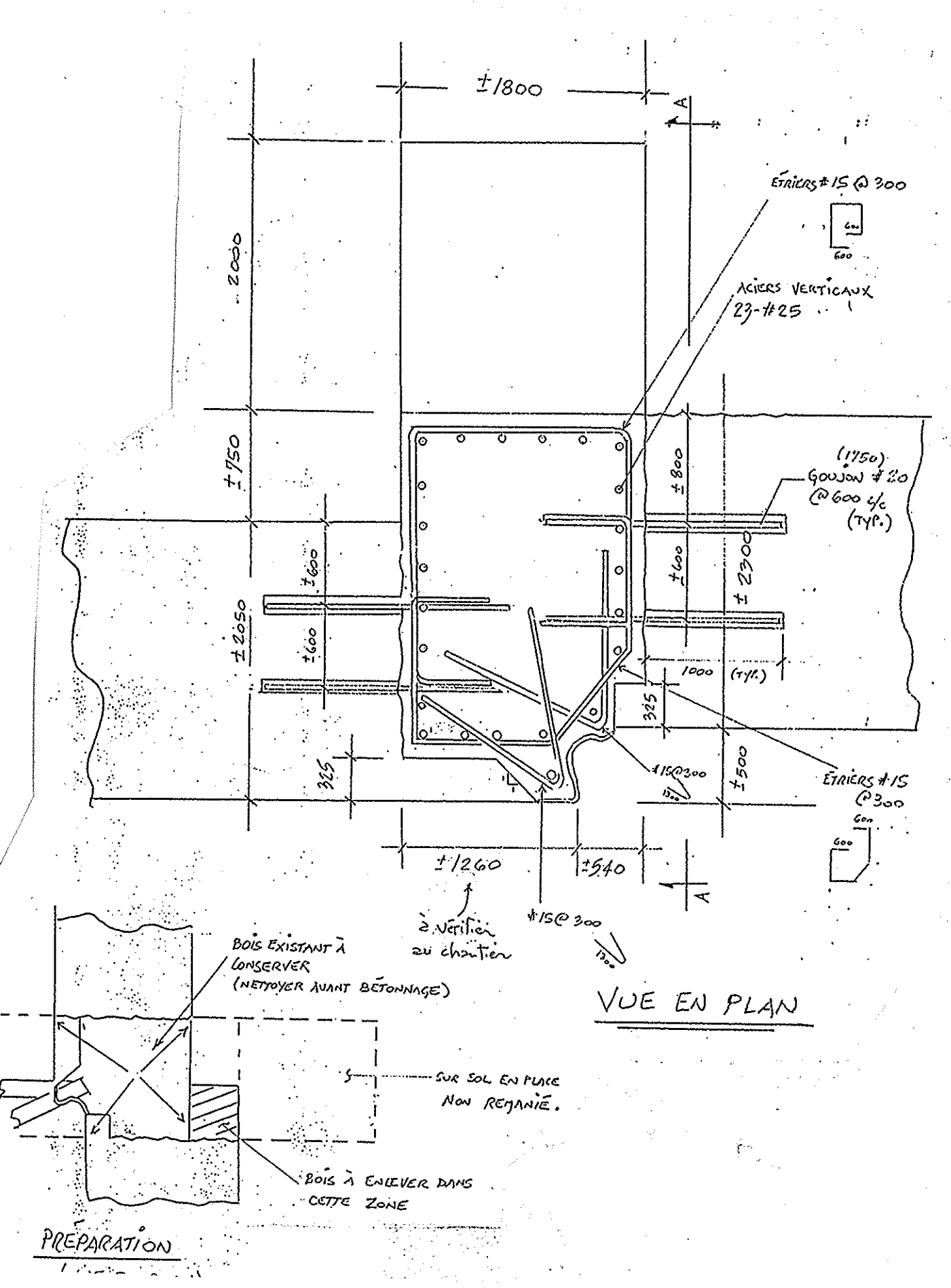
ARRANGEMENT GENERAL
ZONES " POUTRELLE DE VANNAGE "

	AVANT	APRÈS
ELEVATION REQUISE SOUS PIVOT	25850	25850
ELEVATION BOIS	25830	25790
ÉPAISSEUR ACIER	20mm	60mm

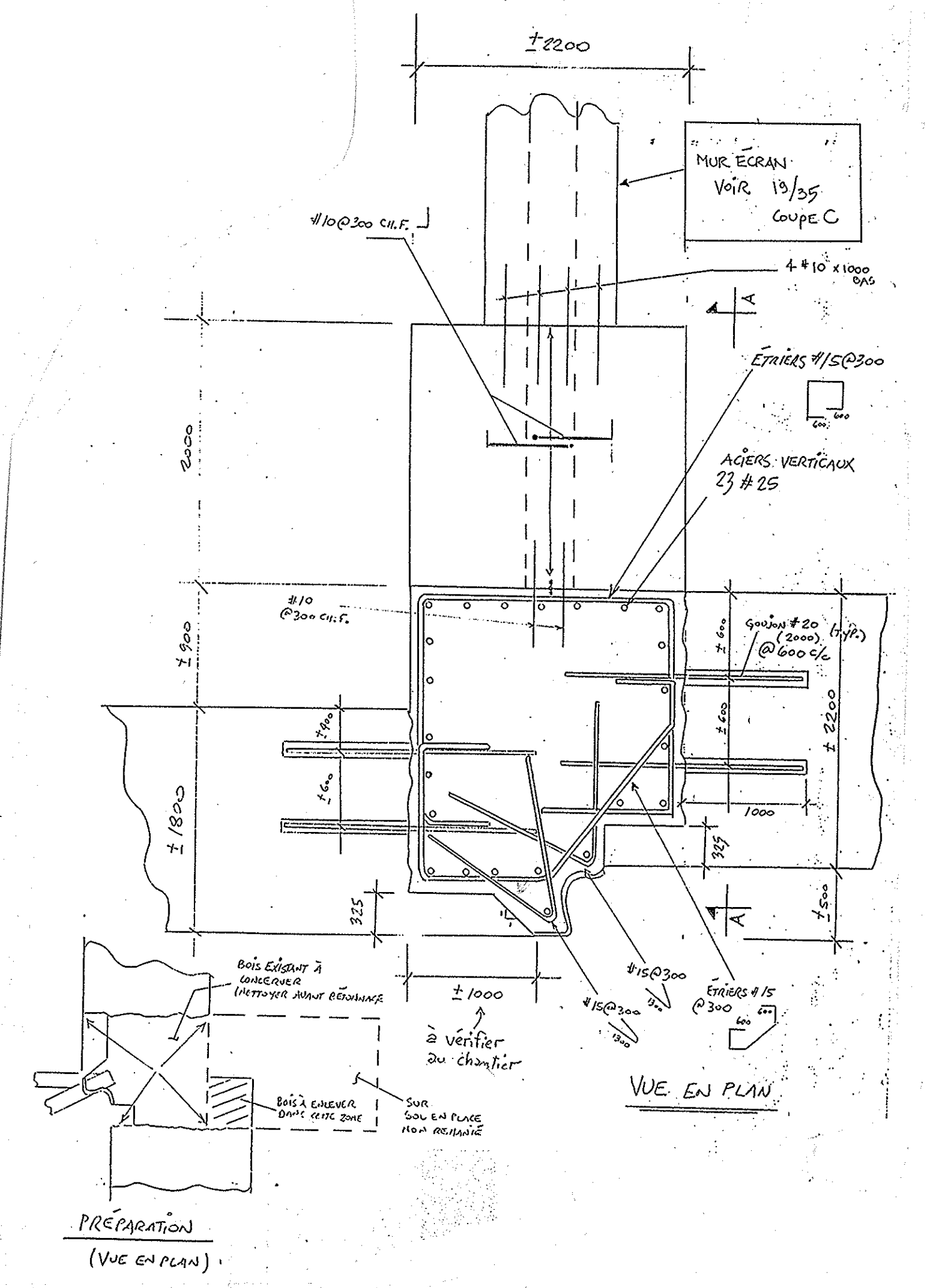


TOLE DE COIN AMONT COTE "EST"
RECONSTRUCTION
VUE EN PLAN

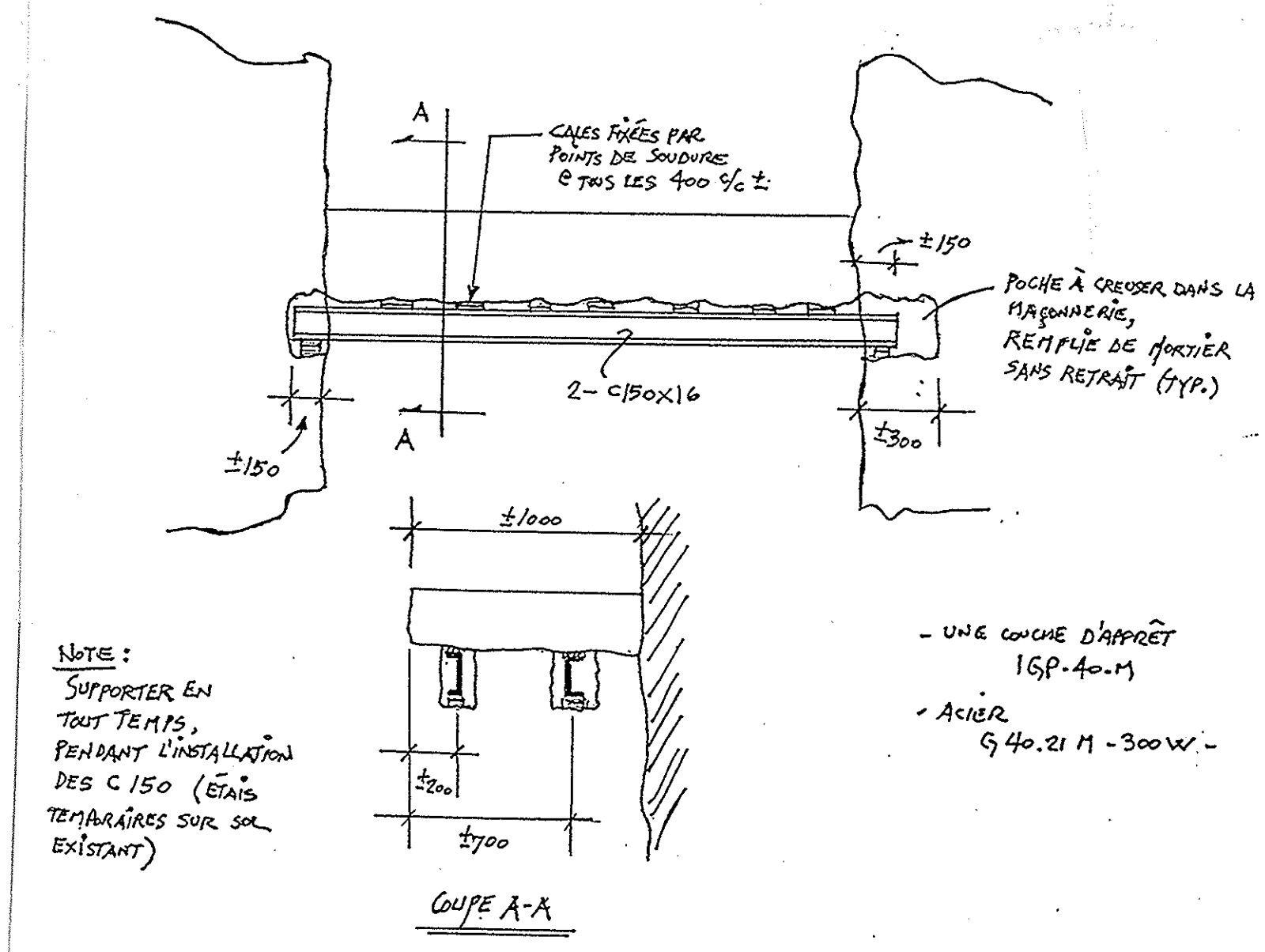
PLAQUES D'APPUI SOUS PIVOT
DES PORTES COTE "EST"



TOLE DE COIN AVAL "EST"
RECONSTRUCTION
VUE EN PLAN



MUR DE MAÇONNERIE
" SUPPORT DES TABLETTES "



TOLE DE COIN AMONT COTE "EST"
RECONSTRUCTION
VUE EN ELEVATION

S-28A/3864/35

Appendix V
Electric room (geometry)

Modifications

2-	TEL QUE CONSTRUIT	JAN. 1995
2-	AS BUILT	JAN. 1995
1-	REVISÉ	MAI 1993
1-	REVISED	MAY 1993



A. n. du détail	A. detail n.
B. localisation	B. location
C. sur feuille n.	C. on sheet n.

Dessiné par	Drawn by
Conçu par	Design by
Vérifié par	Checked by
Approuvé par	Approved by
Charge de projet	Job captain

Richard Laroche	Albert Nollet
Patric Canada	Richard Laroche

Richard Laroche	Albert Nollet
Richard Laroche	Richard Laroche

Richard Laroche	Albert Nollet
Richard Laroche	Richard Laroche

Richard Laroche	Albert Nollet
Richard Laroche	Richard Laroche

AMENAGEMENT DE L'AIRE DE L'ÉCLUSE No.9	DEVELOPMENT OF LOCK No.9 AREA
CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.

AMENAGEMENT DE L'AIRE DE L'ÉCLUSE No.9	DEVELOPMENT OF LOCK No.9 AREA
CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.

AMENAGEMENT DE L'AIRE DE L'ÉCLUSE No.9	DEVELOPMENT OF LOCK No.9 AREA
CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.

AMENAGEMENT DE L'AIRE DE L'ÉCLUSE No.9	DEVELOPMENT OF LOCK No.9 AREA
CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.

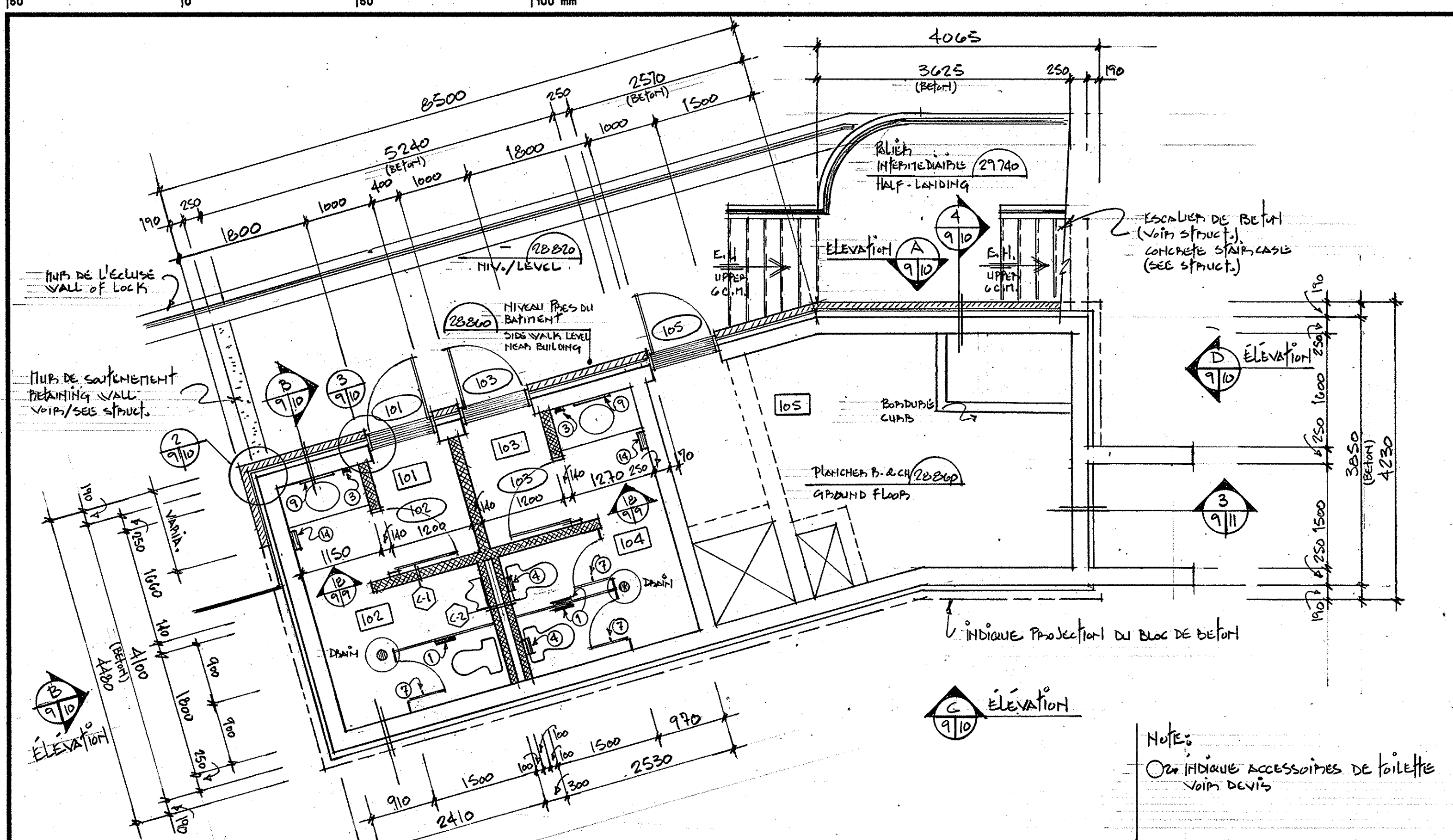
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CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.

AMENAGEMENT DE L'AIRE DE L'ÉCLUSE No.9	DEVELOPMENT OF LOCK No.9 AREA
CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.

AMENAGEMENT DE L'AIRE DE L'ÉCLUSE No.9	DEVELOPMENT OF LOCK No.9 AREA
CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.

AMENAGEMENT DE L'AIRE DE L'ÉCLUSE No.9	DEVELOPMENT OF LOCK No.9 AREA
CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.

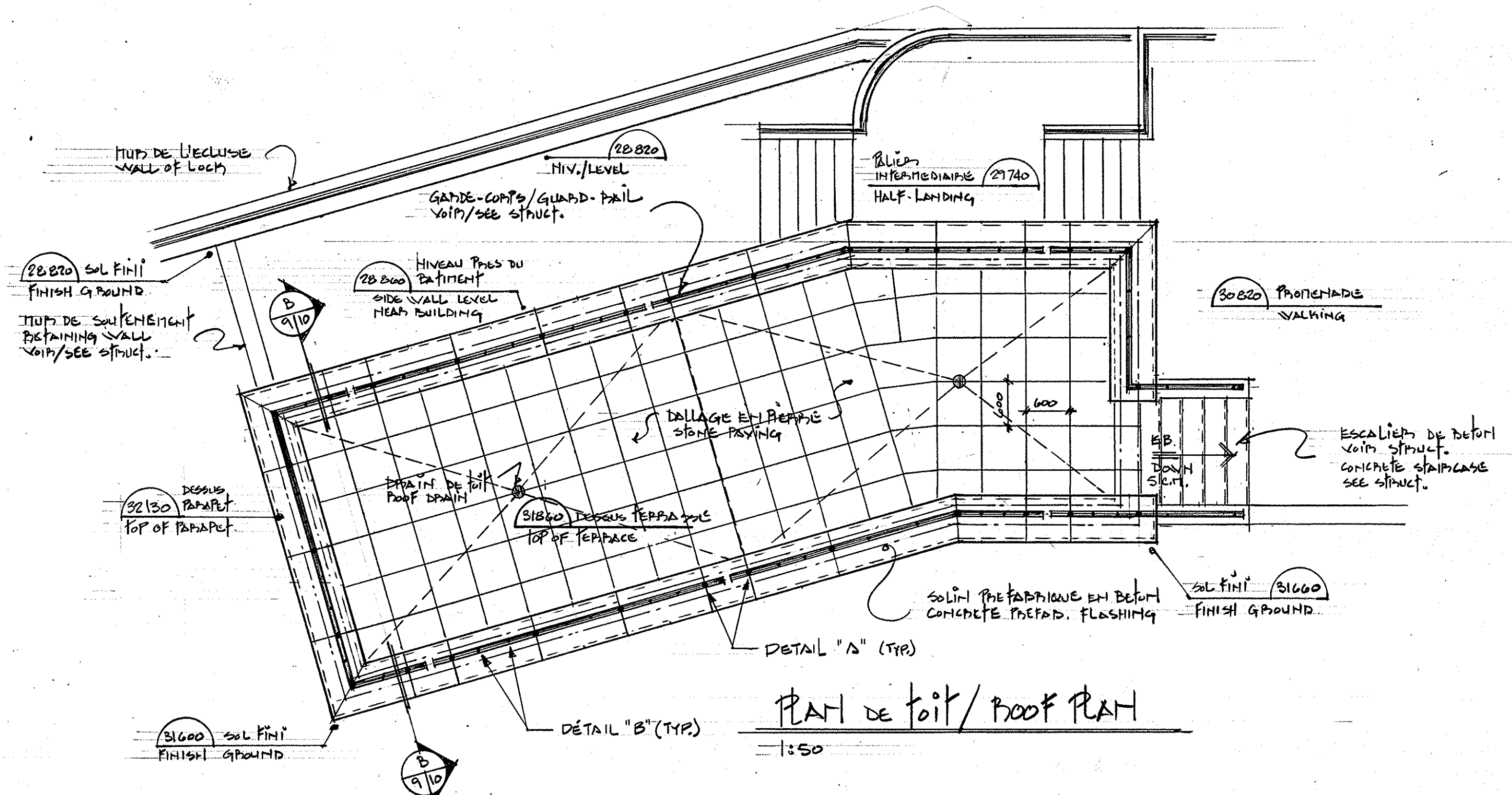
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CANAL CHAMBLY - ST-JEAN, QUÉ.	CHAMBLY CANAL - ST-JEAN, QUÉ.



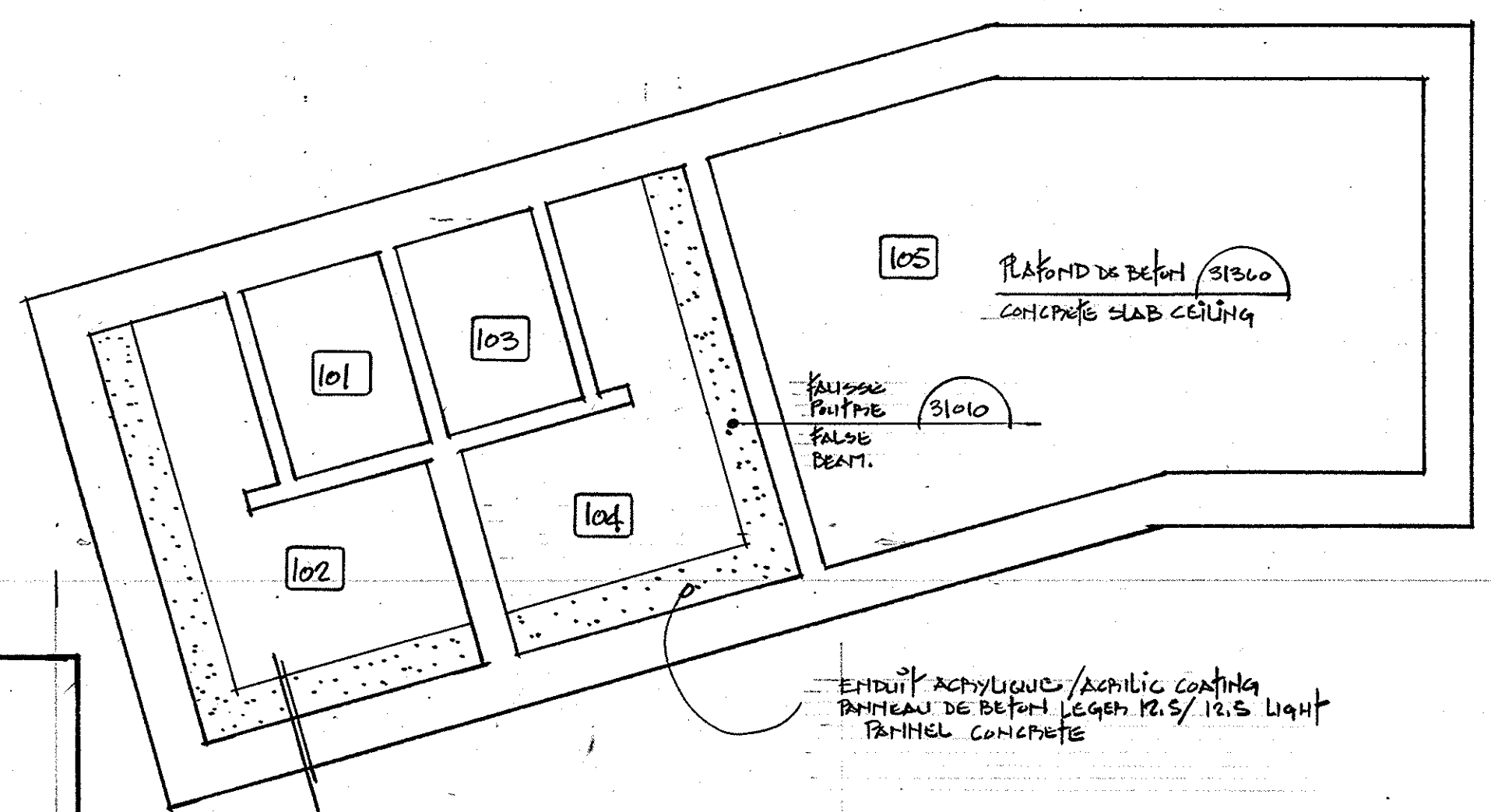
PLAN DU REZ-DE-CHAUSSEE
GROUND FLOOR
1:50

Liste des pièces / Piece List

- 101 HALL
- 102 toilette HOMMES / M.C. MEN'S
- 103 HALL
- 104 toilette FEMMES / M.C. WOMEN'S
- 105 SALLE ELECTRIQUE / ELECTRICAL ROOM

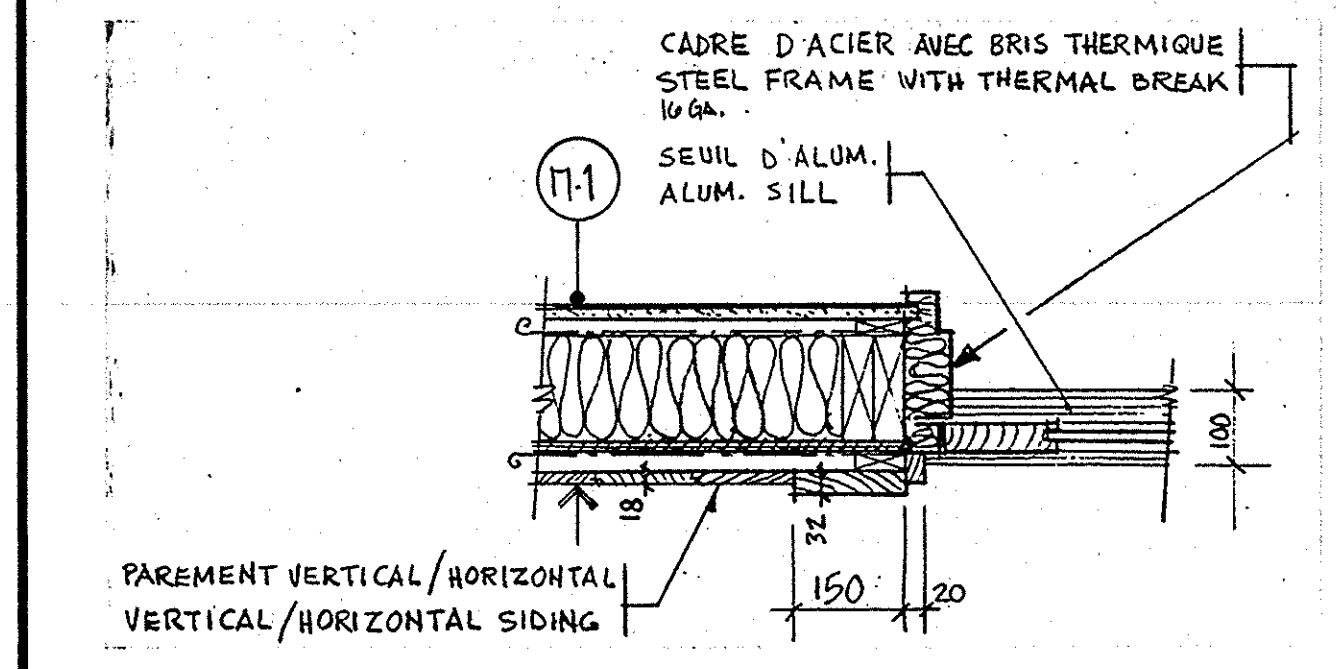


PLAN DE TOIT / ROOF PLAN
1:50

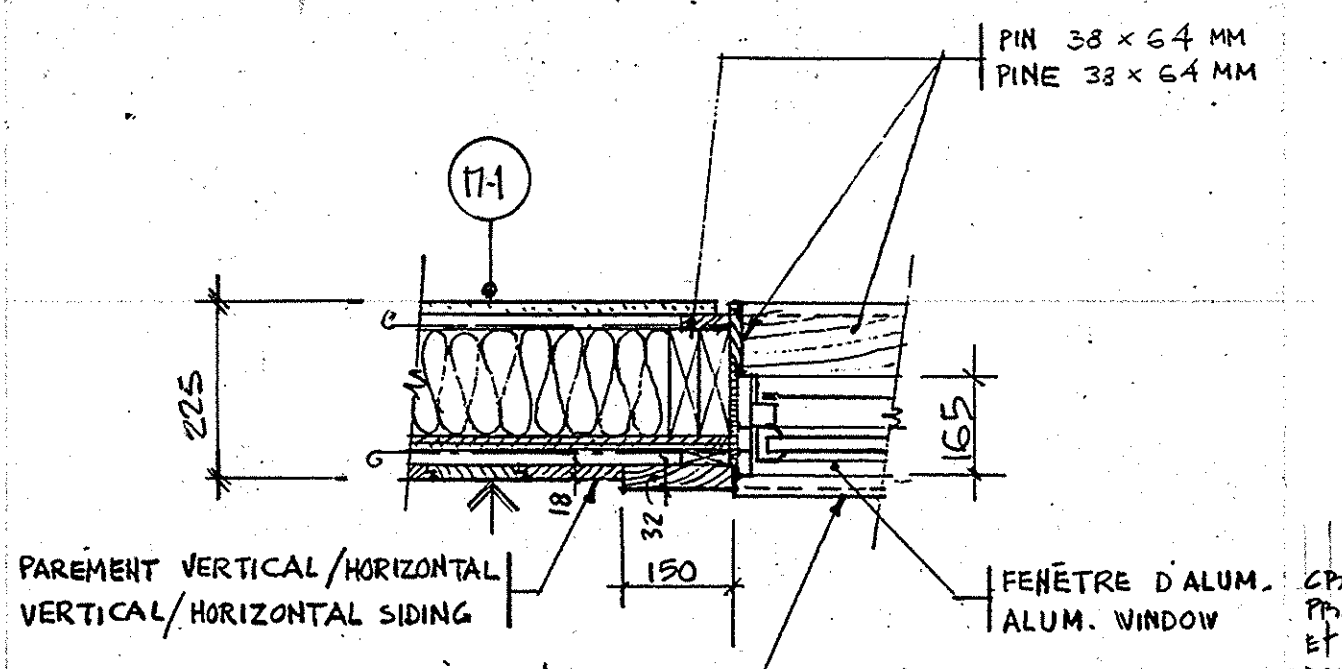


PLAN DE PLAFOND / CEILING PLAN
1:50

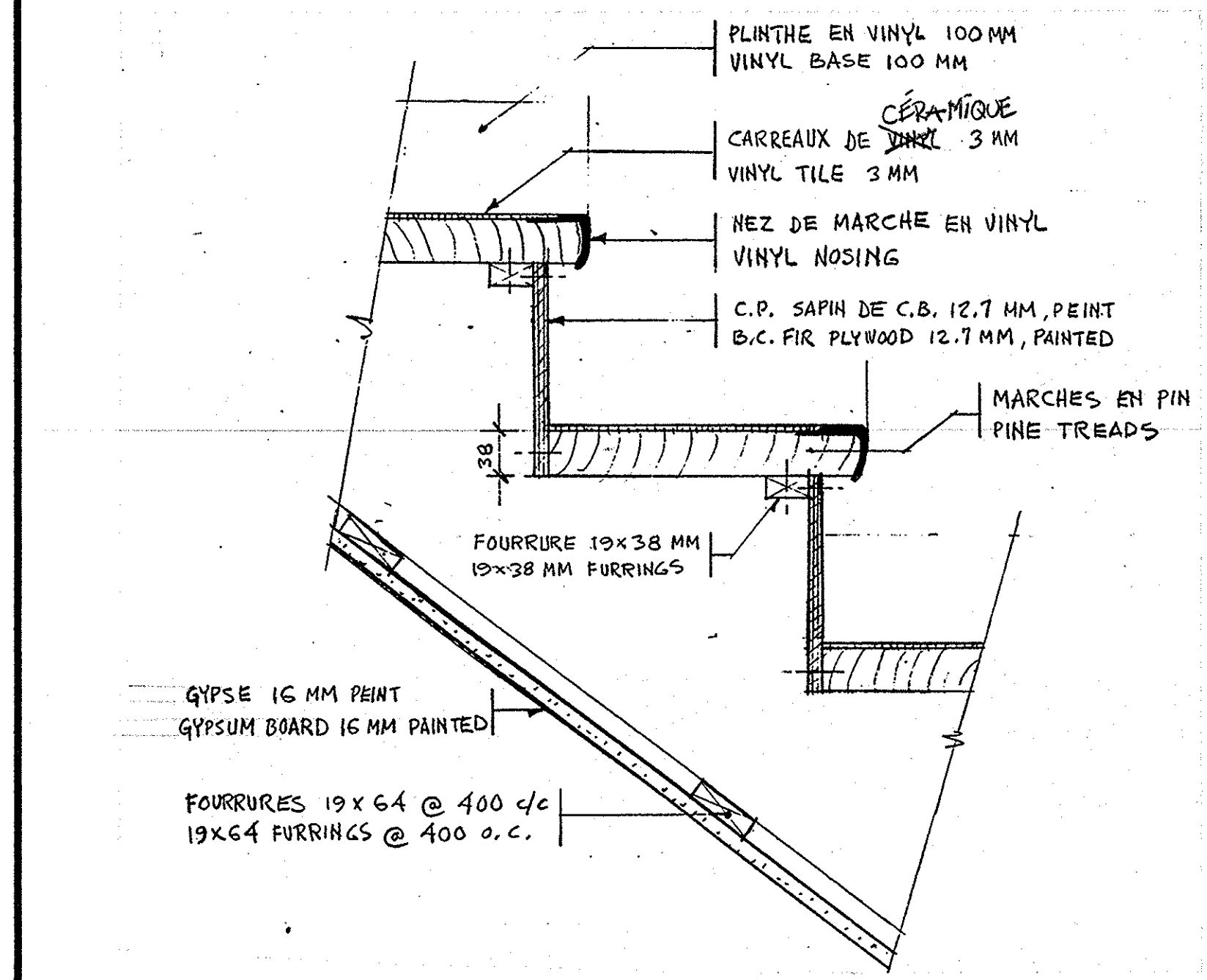
DÉTAILS LOGETTE DÉTAILS



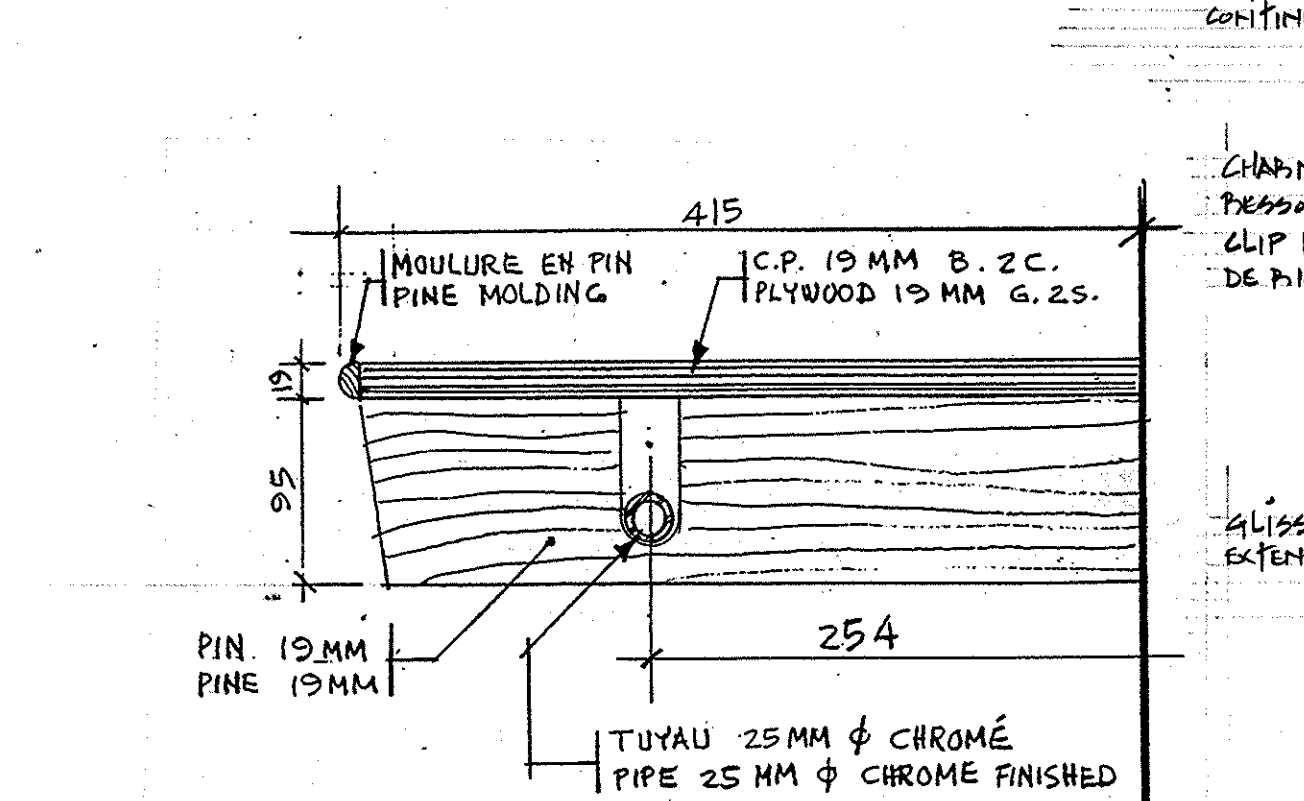
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ECH: 1:10 SCALE



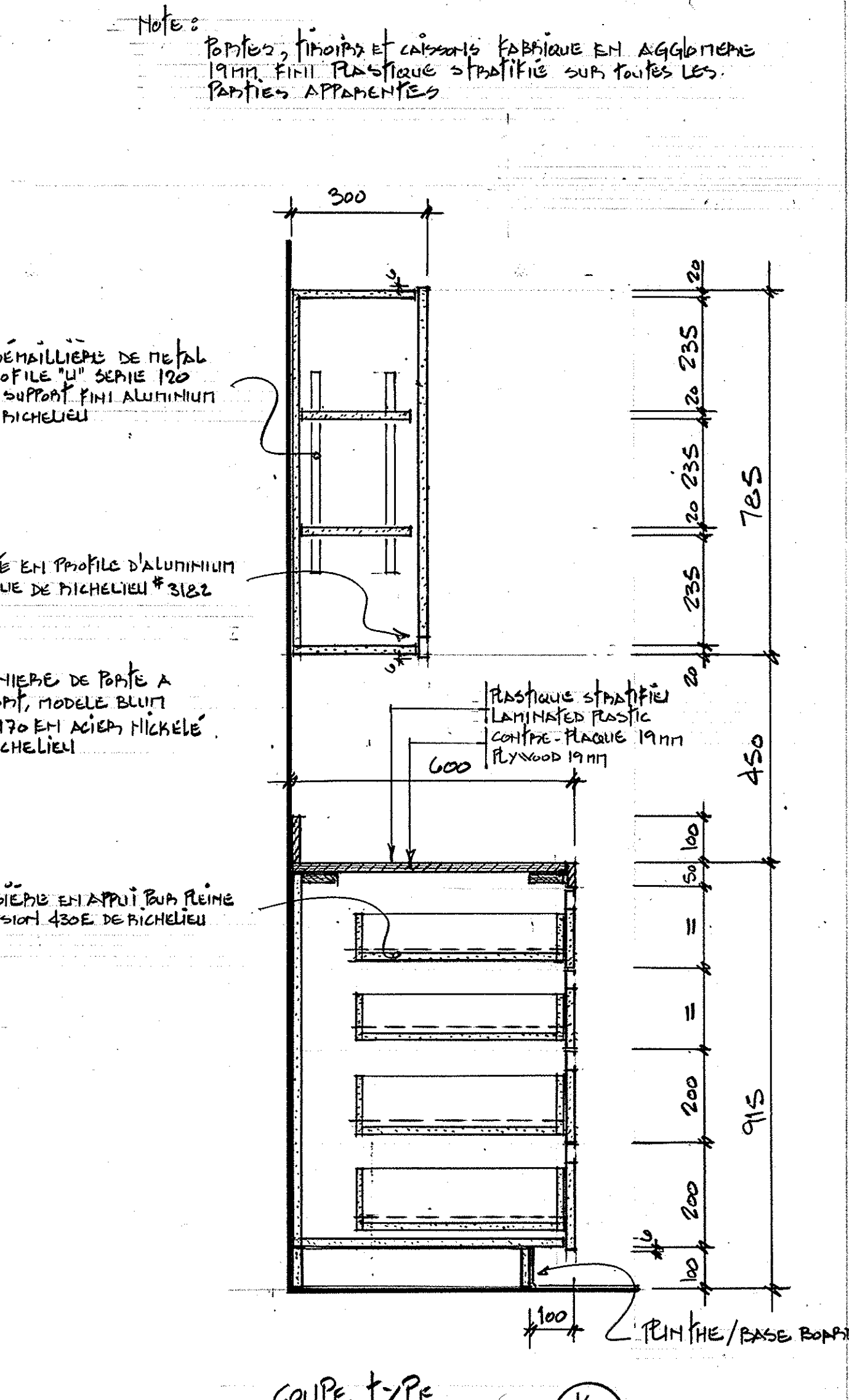
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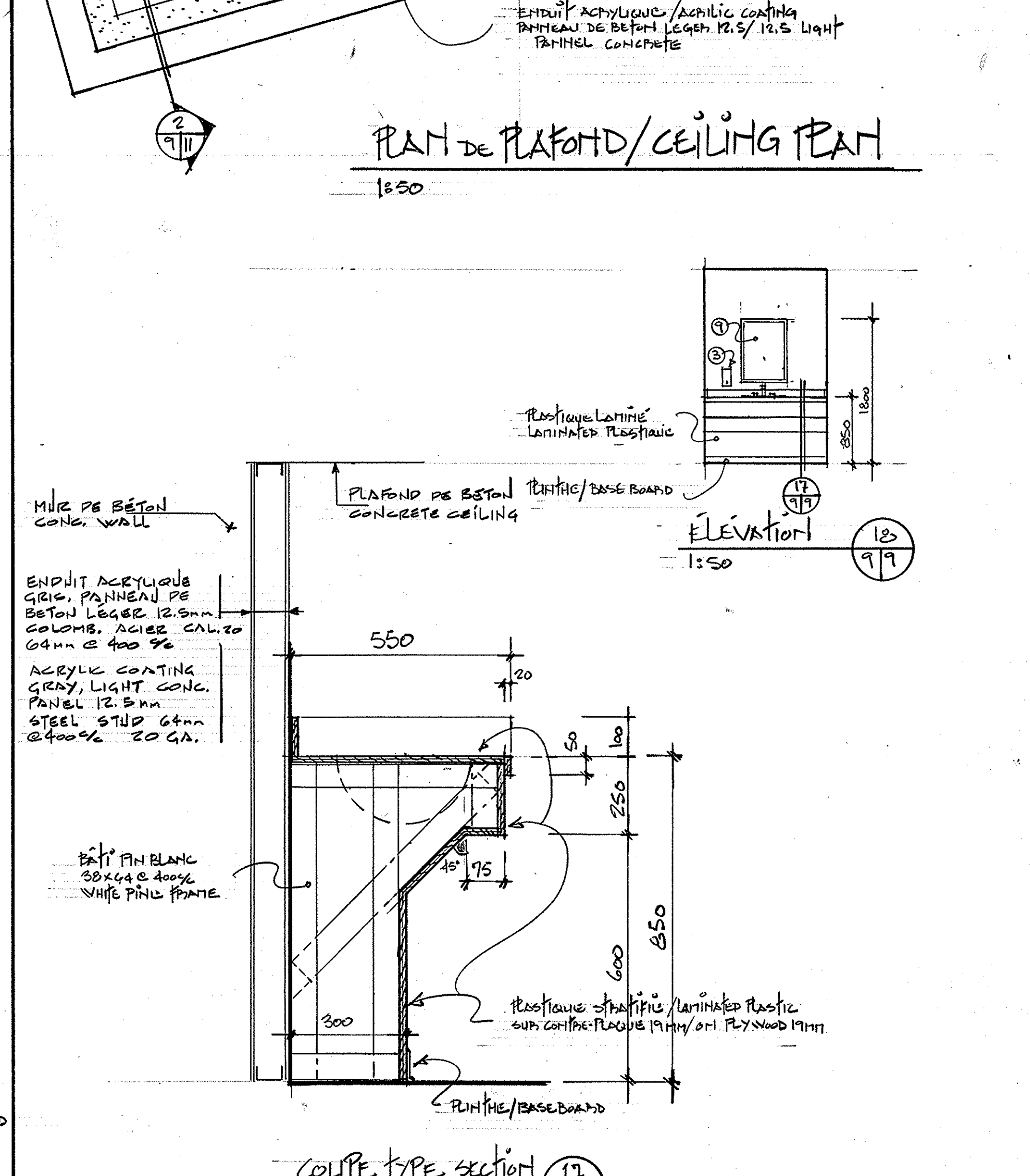
DÉTAIL TYPE 13
ECH: 1:5 SCALE



DÉTAIL TYPE 14
ECH: 1:5 SCALE

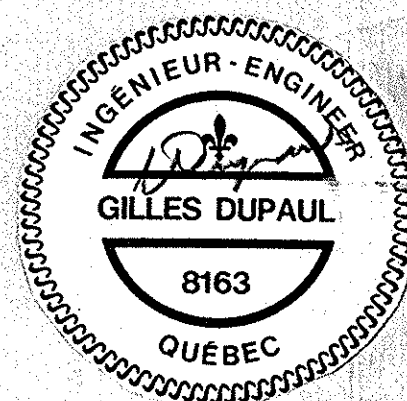
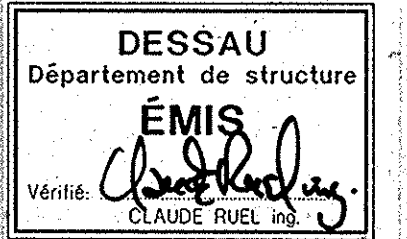


COUPE TYPE SECTION 15
ECH: 1:10 SCALE



COUPE TYPE SECTION 16
1:10

Appendix VI
Log Reports



Modifications

2- TEL QUE CONSTRUIT JAN. 1995
AS BUILT JAN. 1995

1- REVISE MAI. 1993
1- REVISED MAY 1993

DESSAU Les Consultants Dessau Inc.

A: n. du détail A: detail n.
B: localisation B: localisation
C: sur feuille n. C: on sheet n.

Dessiné par Drawn by
Conçu par Design by
G. DUPAUL

Vérifié par Checked by

Approuvé par Approved by

Chargé du projet Job captain
RICHARD LAROCHE

Chef de Section Section head
ALBERT NOLLET

Gérant de secteur Area manager
RICHARD LAROCHE

Nom du projet Project title

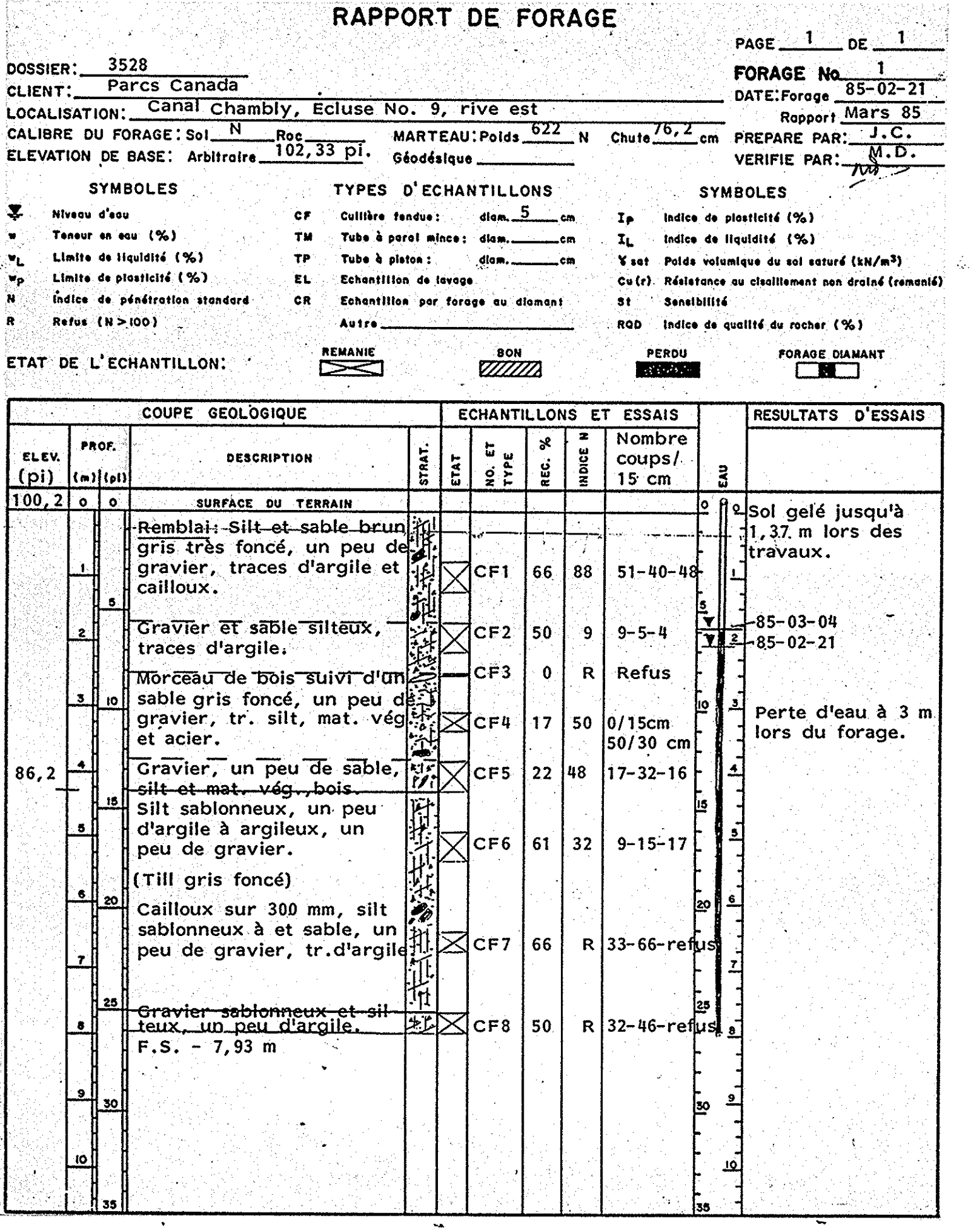
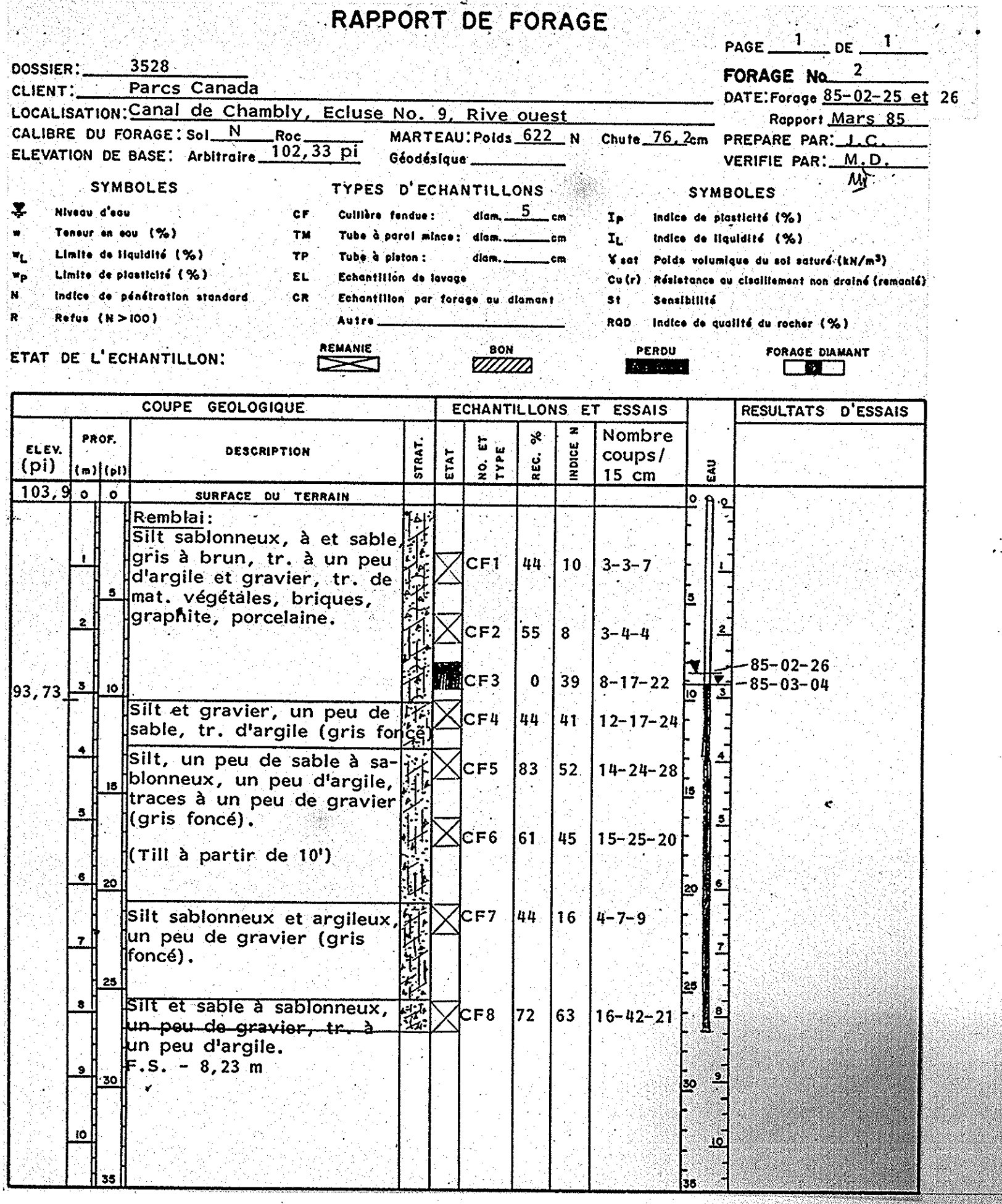
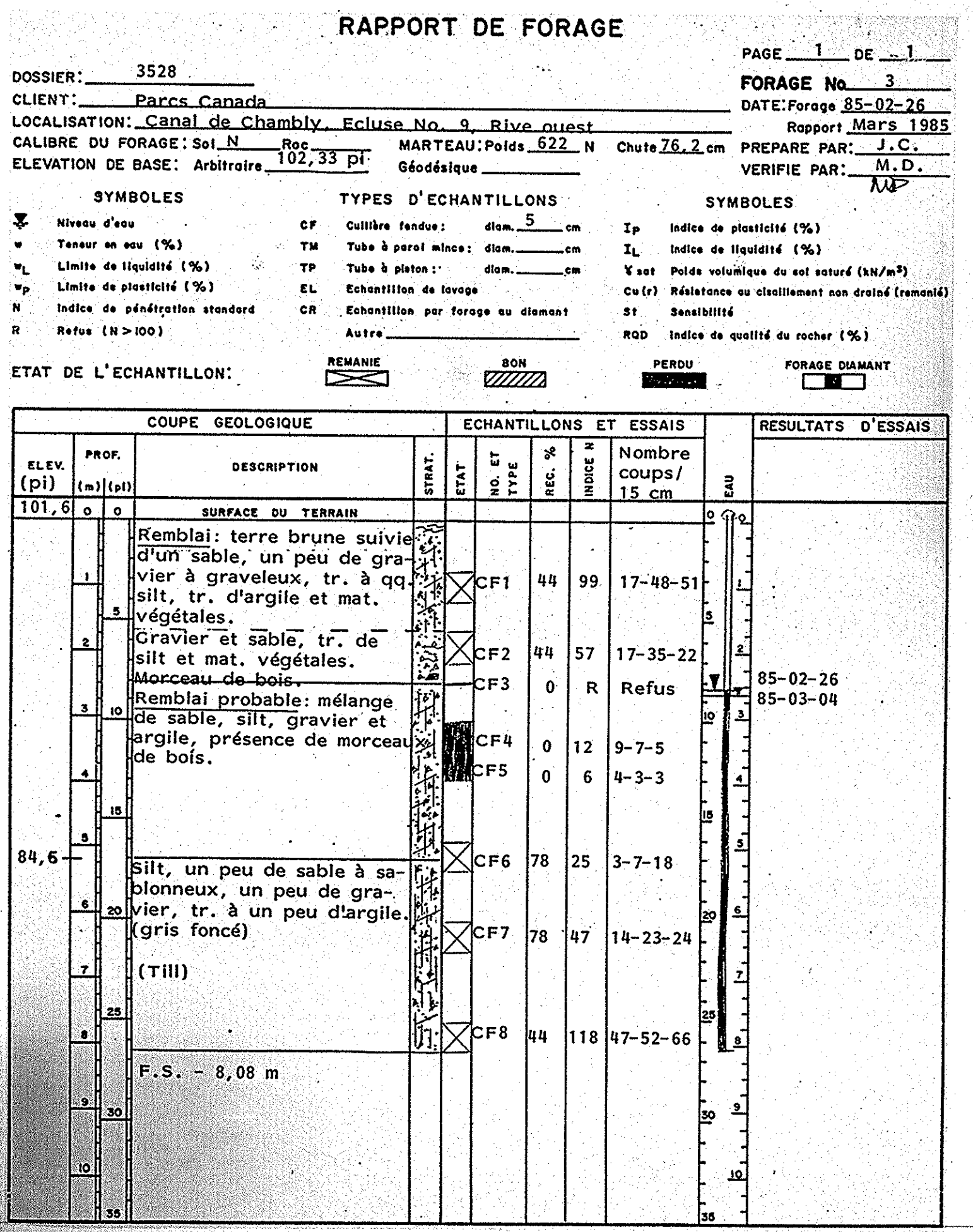
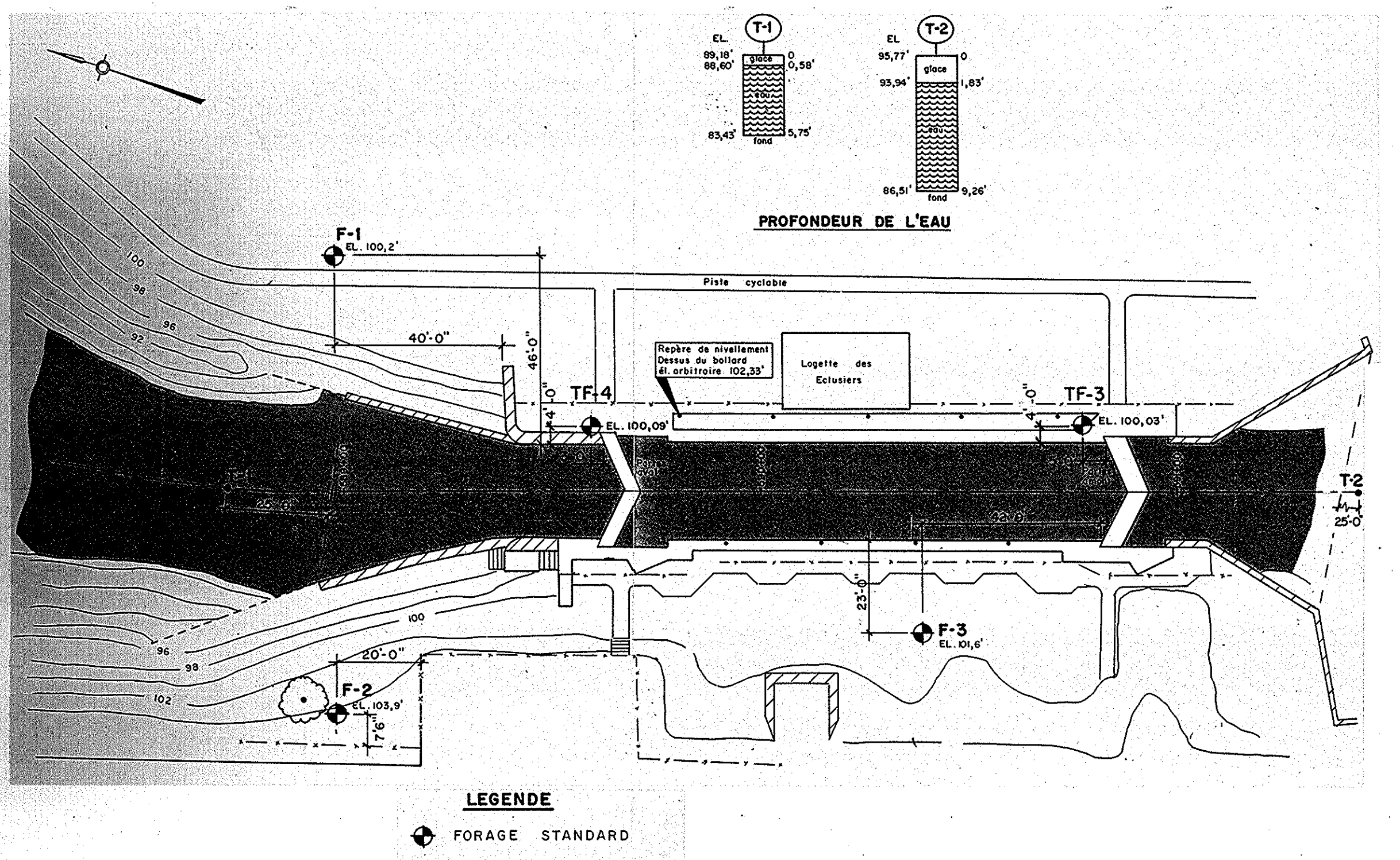
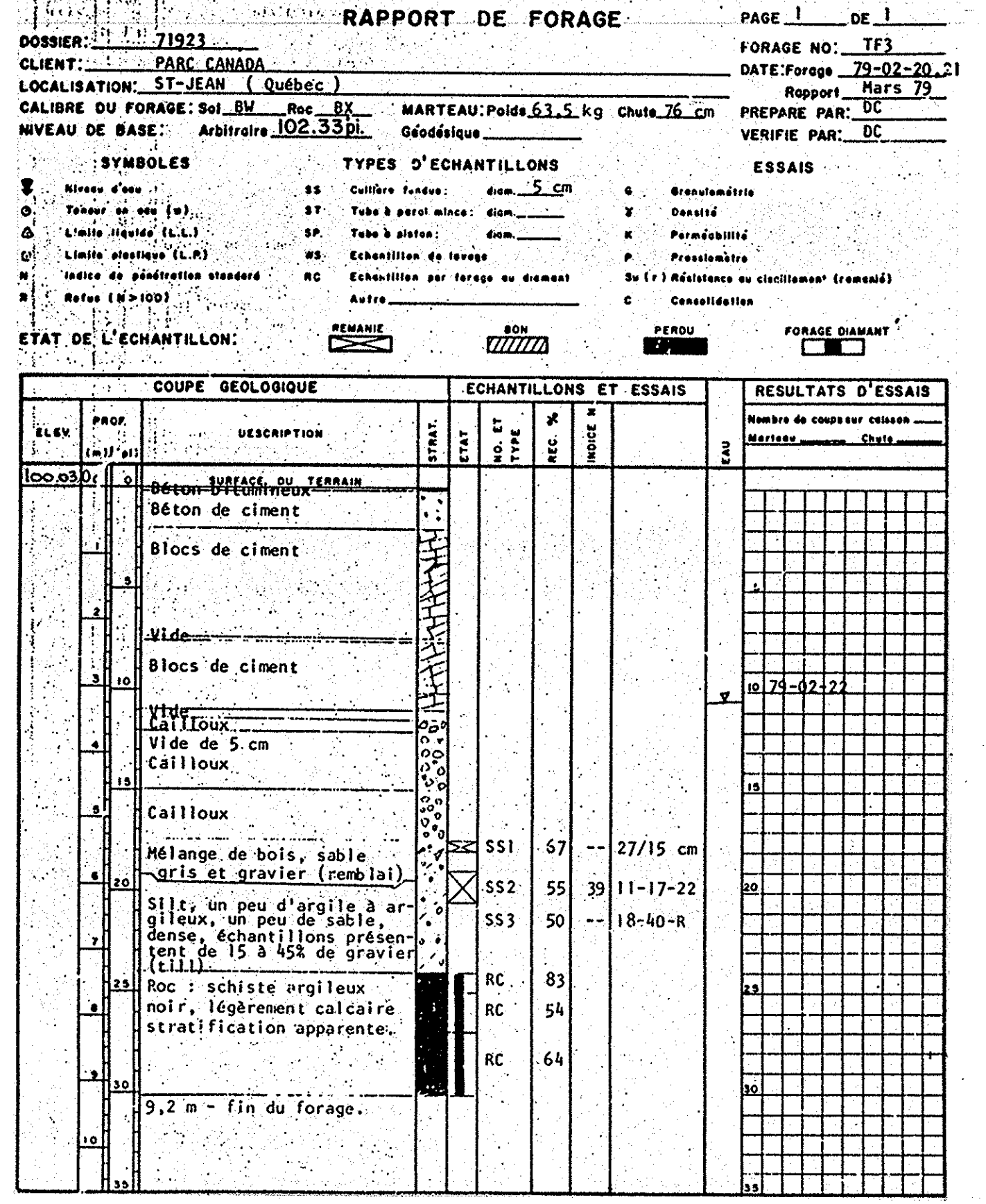
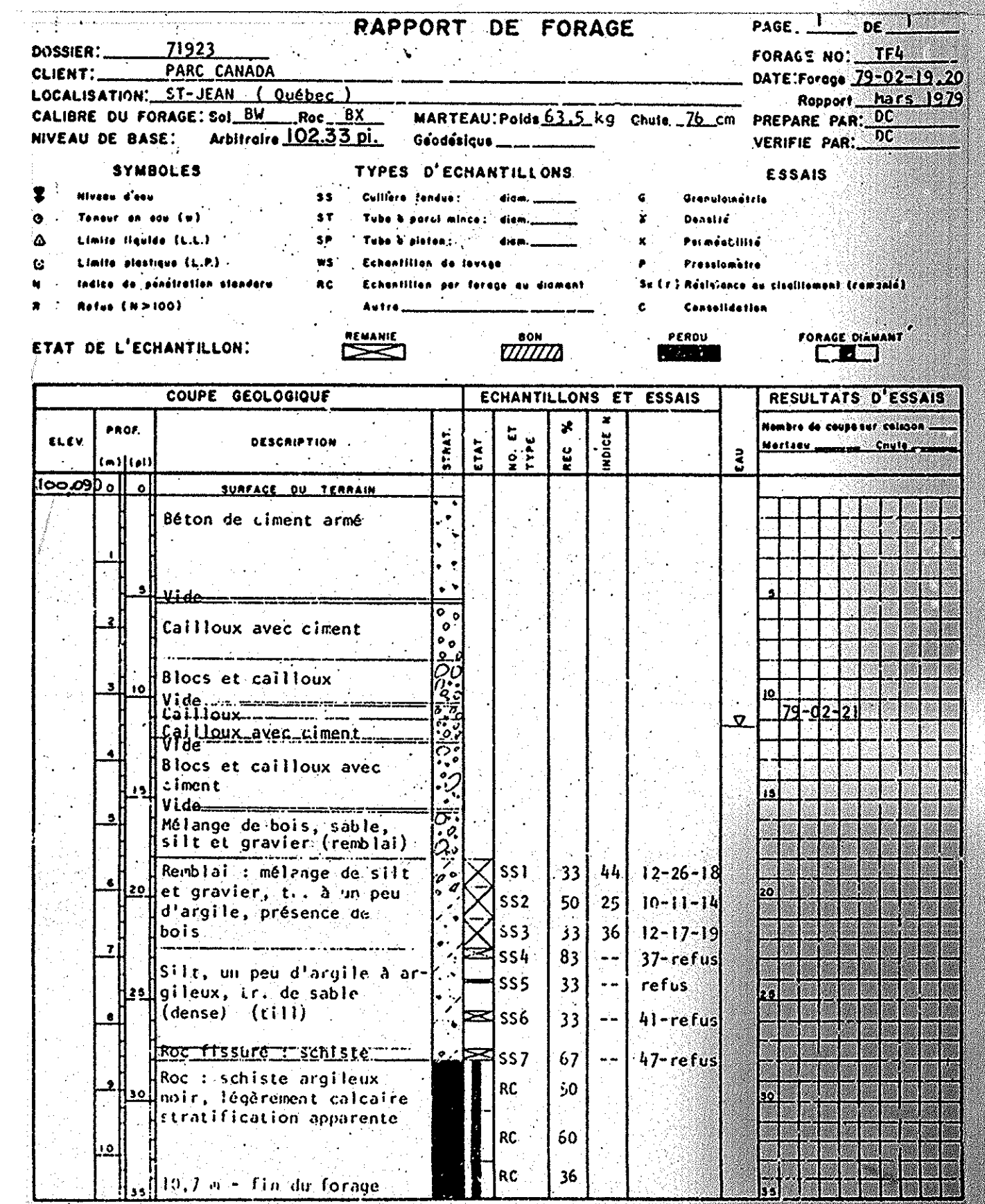
AMENAGEMENT DE L'ARE DE L'ECLUSE No.9 CANAL CHAMBLY - ST-JEAN, QUÉ

DEVELOPMENT OF LOCK No.9 AREA CHAMBLY CANAL - ST-JEAN, QUE.

Titre du dessin Drawing title

FORAGES BORE HOLES

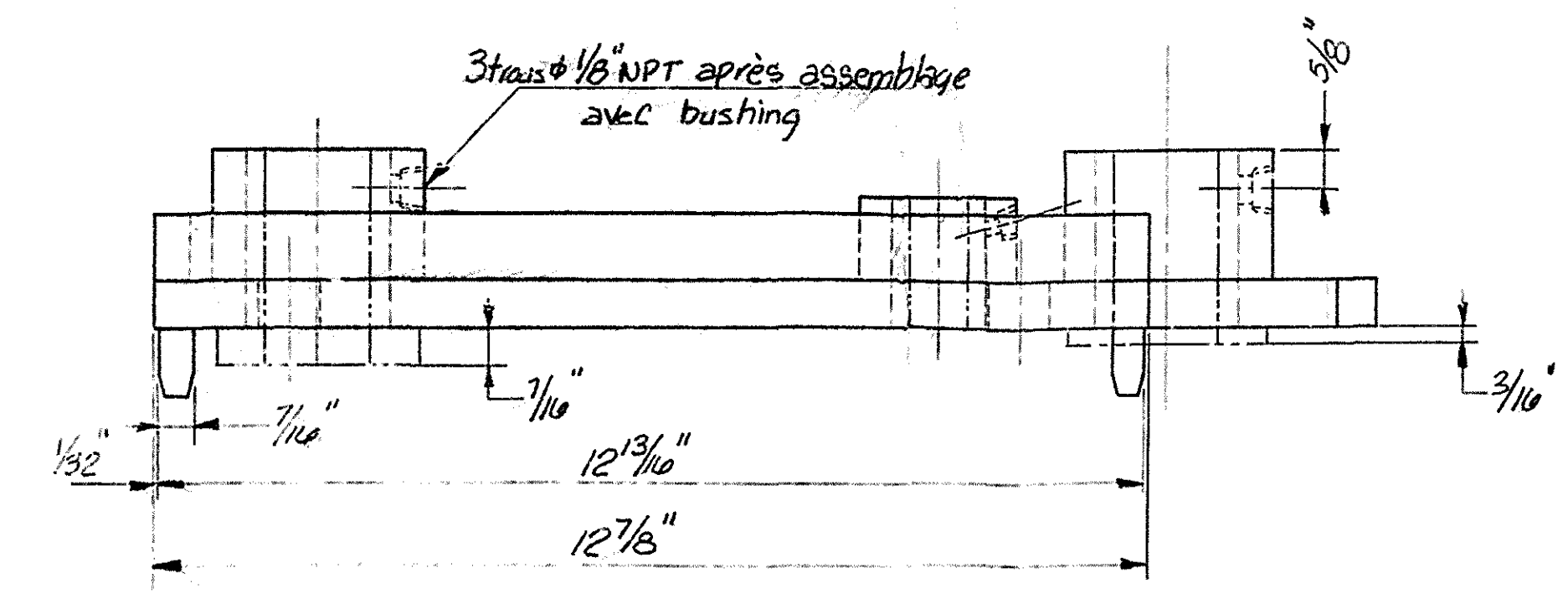
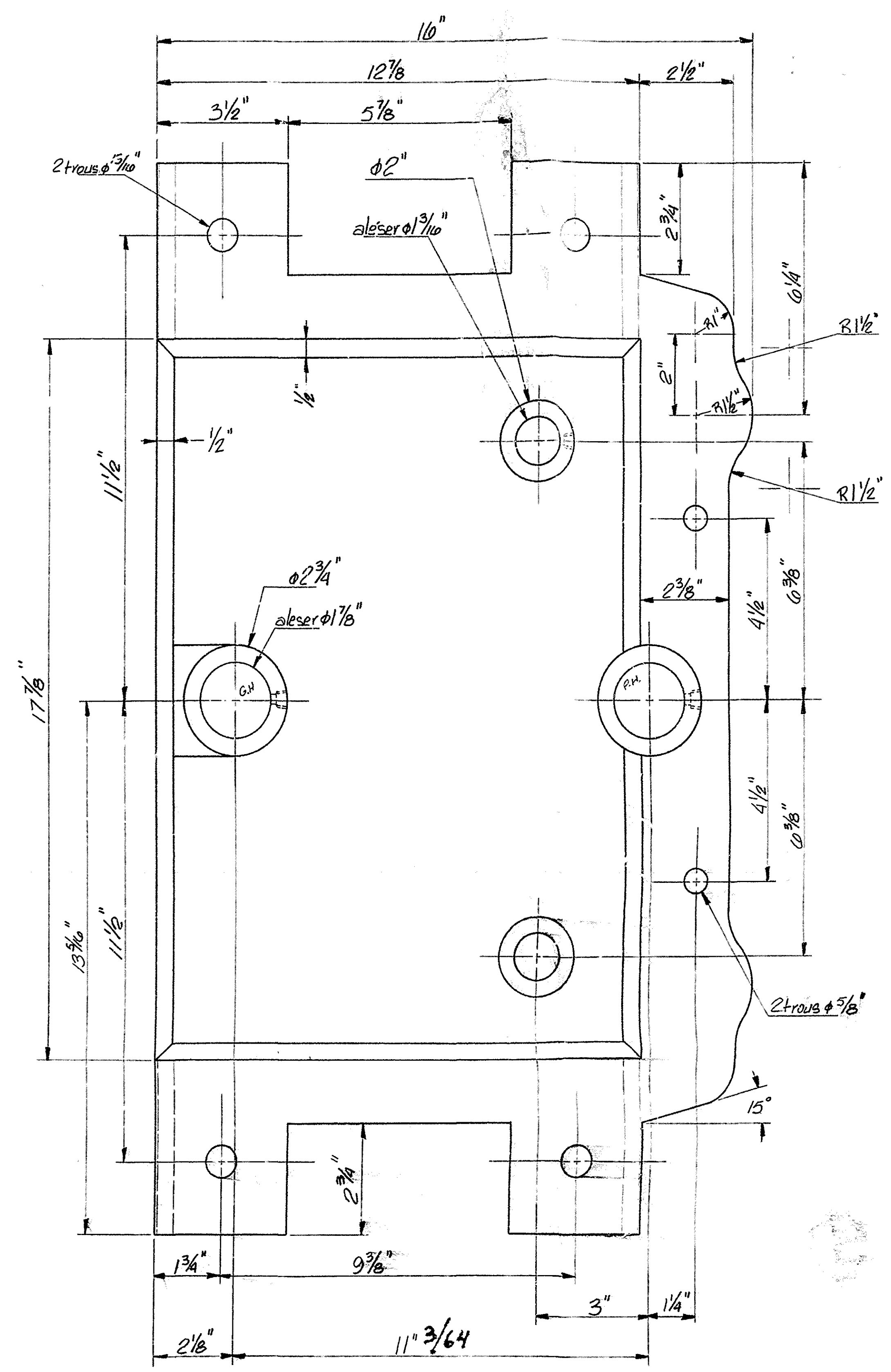
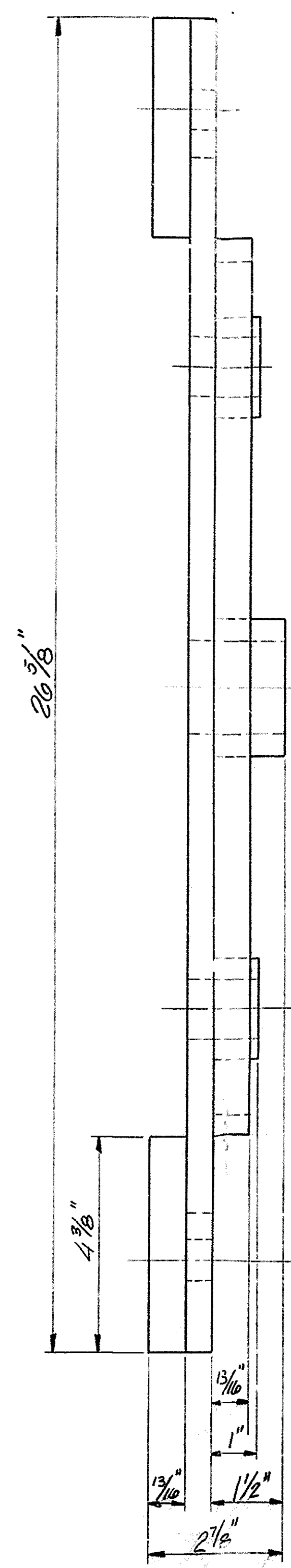
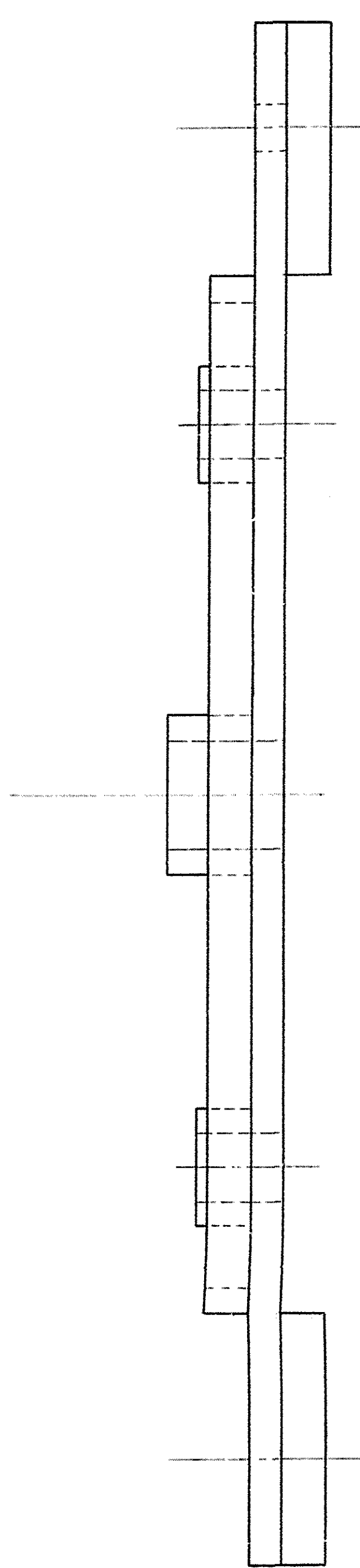
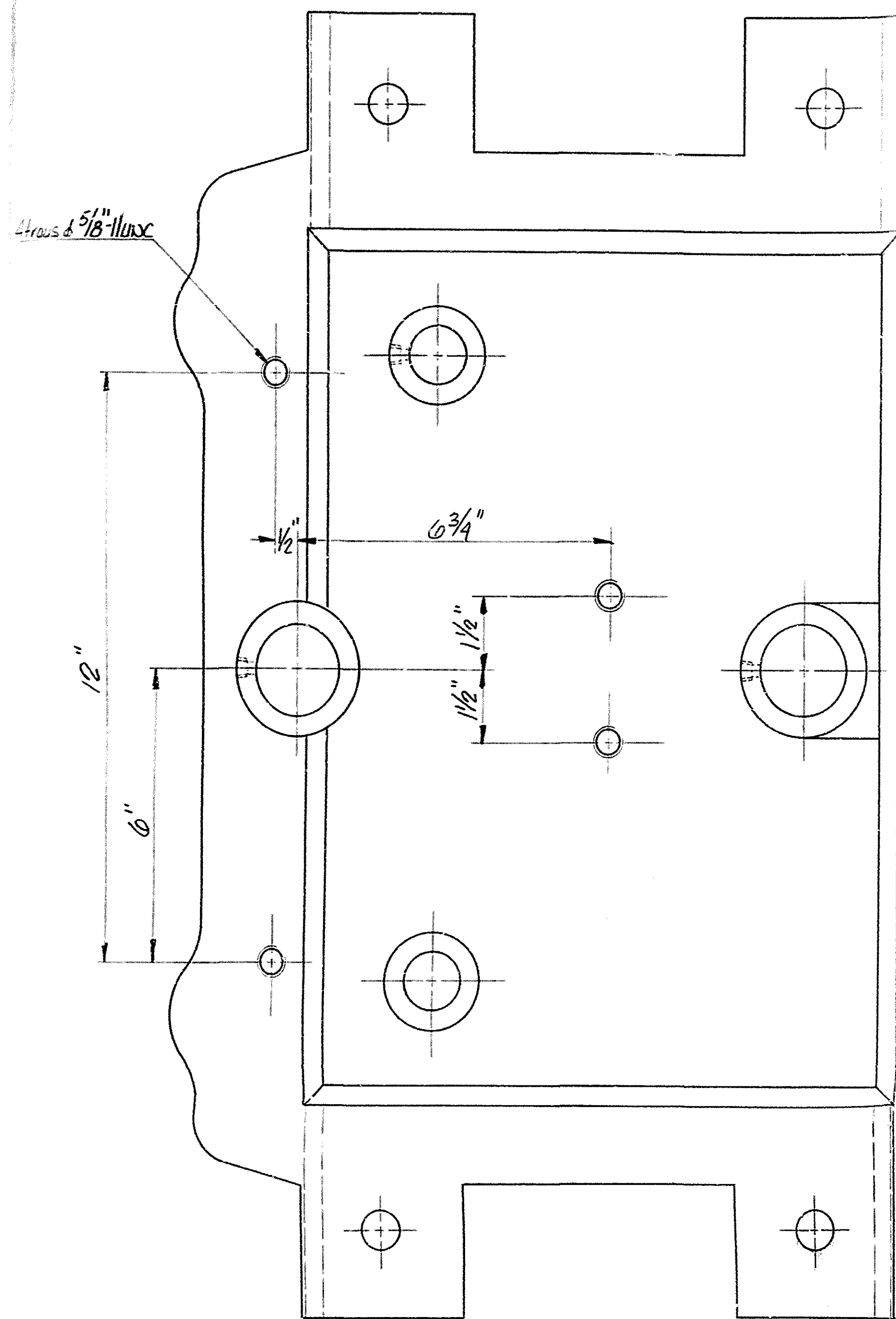
Date AOUT/AUG. '85 Dessau proj. no. 3864 feuille
Echelle Scale 32
N. de référence Reference n. 131/09/PR.1-5 Sheet 35



S-32/35 Proj. 3864 - AMENAGEMENT ECLUSE No.9.

Appendix VII

Sluice Mechanisms and others

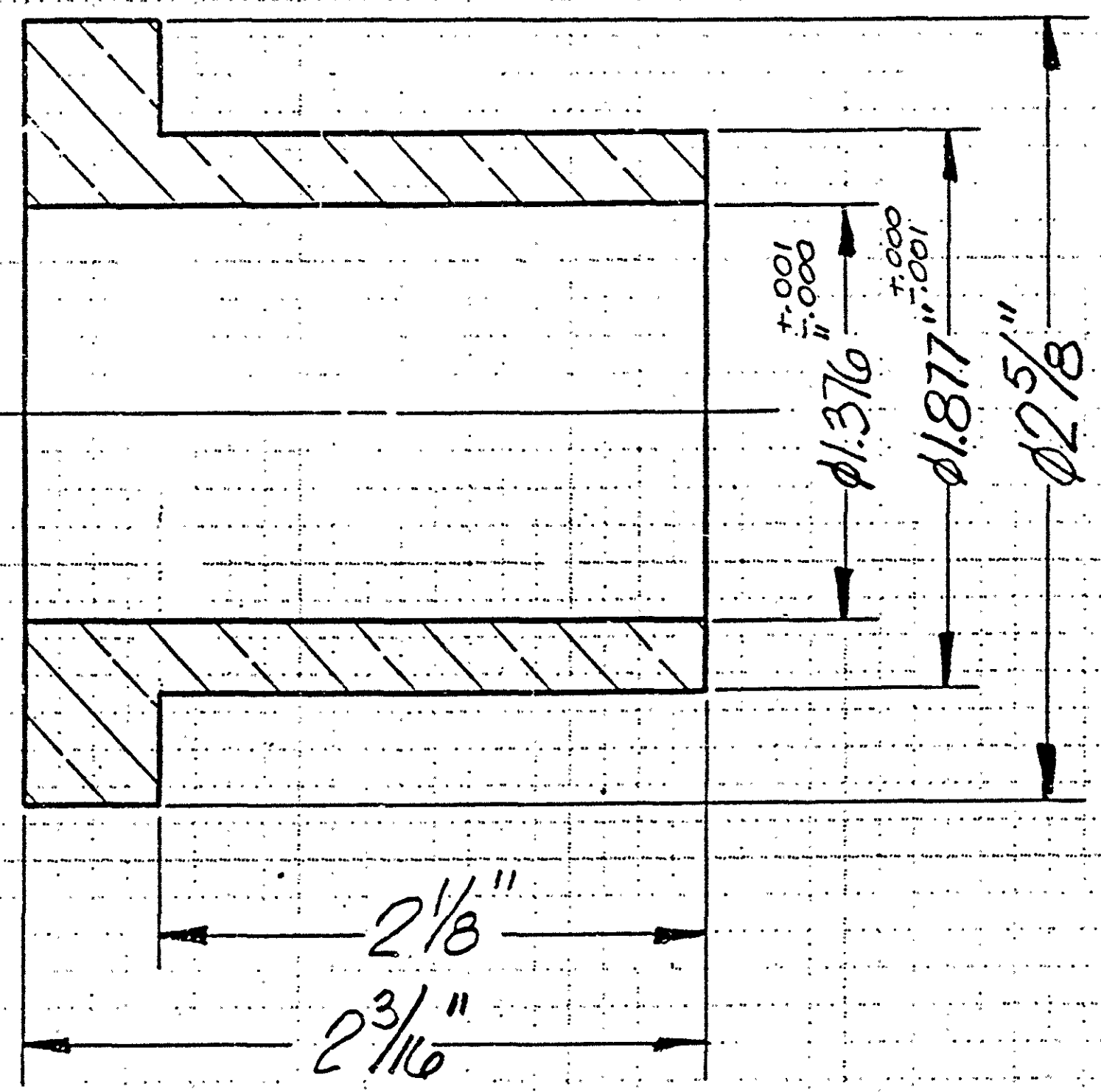


PROJET CANAL CHAMBLY	
ECLUSE 1, 2, 3	
TITRE	
COTÉ DU MECANISME DE VANNE	
DATE	90/10/02
SCALE	1/2" = 1"
REF.	RU-C-23-161.1



Environnement
Canada
Service Canadien
des Parcs

Environment
Canada
Canadian Parks
Service



materiel
bronze sae 660

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



Dessiné par Drawn by

Conçu par Design by

Vérifié par Checked by
Azarie Lavigne
Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain
Azarie Lavigne

Chef de section Section head
Jean-Claude Langlois

Gérant de secteur Area manager
Pierre Parent

Projet Project
CANAL CHAMBLY
ECLUSE No.1-2-3
MECANISME DE VANNES

Titre du dessin Drawing Title
coussinet de bronze
partie supérieur du
mecanisme de vanne
ru-c-23-161.2

Date 90-10-02 Feuille

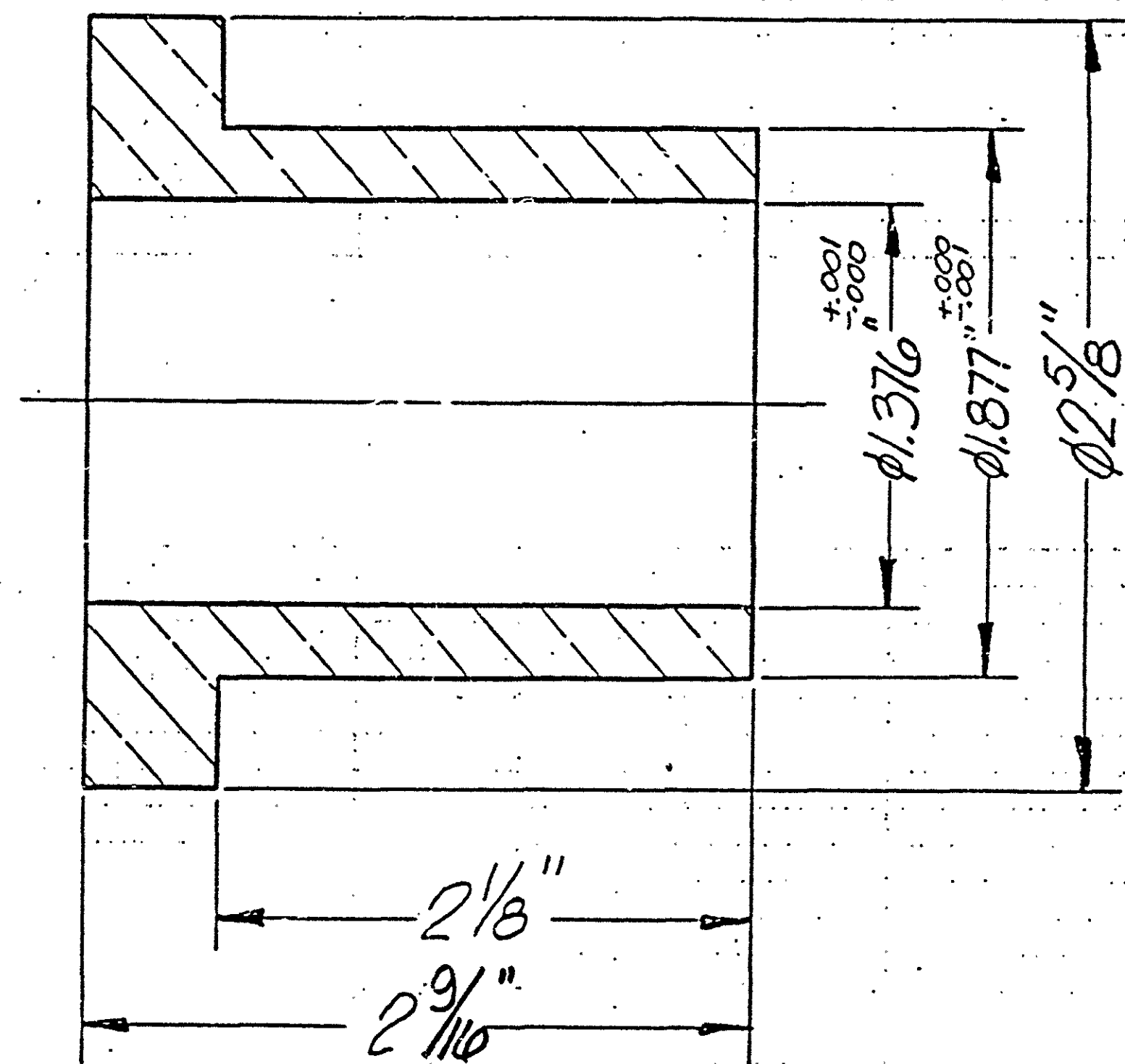
Echelle Scale 2/52 Sheet

No. de référence Reference no.



Environnement
Canada
Service Canadien
des Parcs

Environment
Canada
Canadian Parks
Service



materiel
bronze sae 660

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



Dessiné par Drawn by

Conçu par Design by

Vérifié par Checked by
Azarie Lavigne
Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain

Azarie Lavigne

Chef de section Section head

Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

**coussinet de bronze
partie inférieur du
mecanisme de vanne
ru-c- 23- /61.3**

Date
90-10-02

Echelle Scale

Feuille
3/
52
Sheet

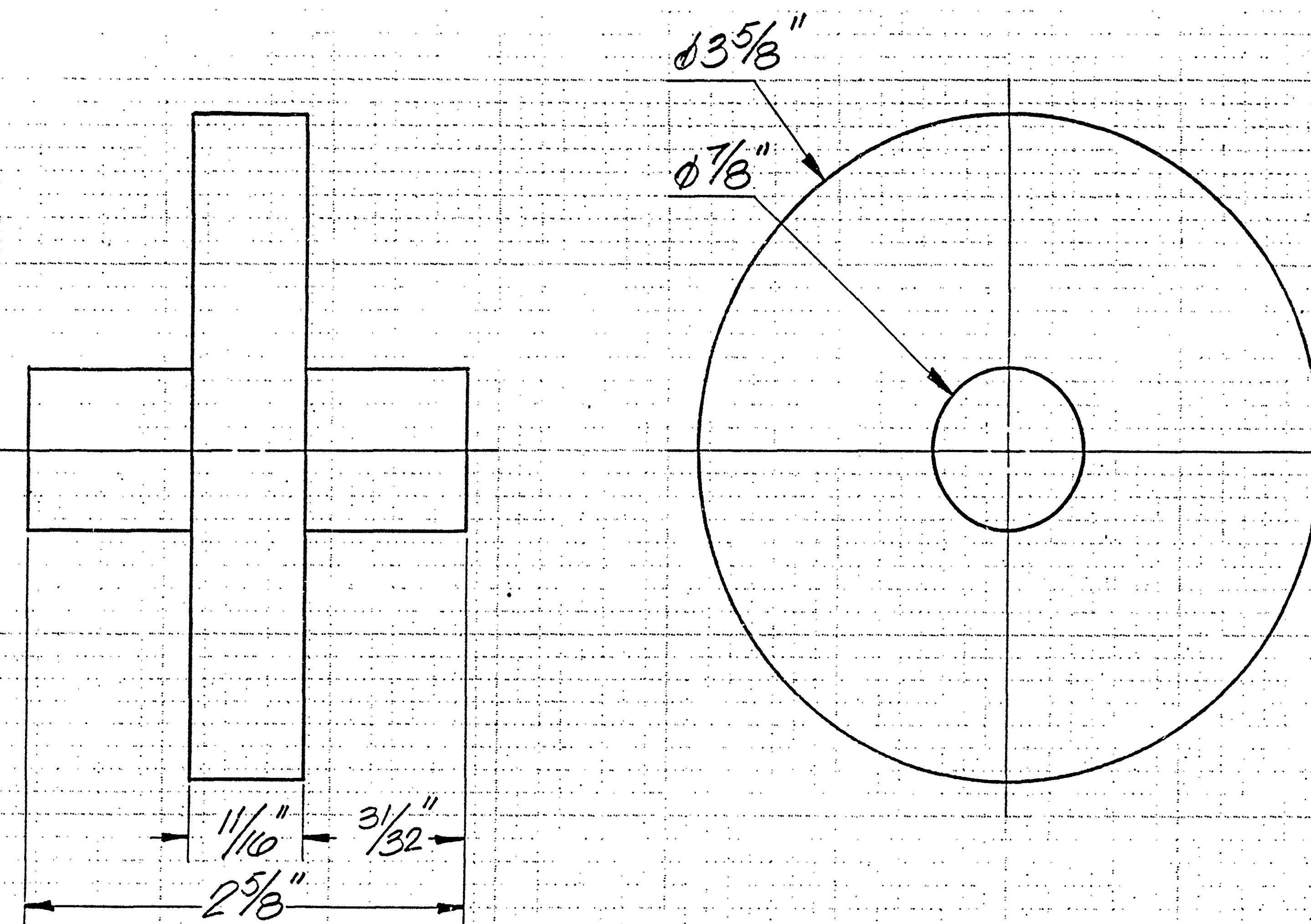
No. de référence

Reference no.



Environnement
Canada
Service Canadien
des Parcs

Environment
Canada
Canadian Parks
Service



materiel
acier lamine a chaud

Modifications

A. No du detail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



Dessiné par Drawn by

Conçu par Design by

Vérifié par Checked by
Azarie Lavigne
Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain
Azarie Lavigne

Chef de section Section head
Jean-Claude Langlois

Gérant de secteur Area manager
Pierre Parent

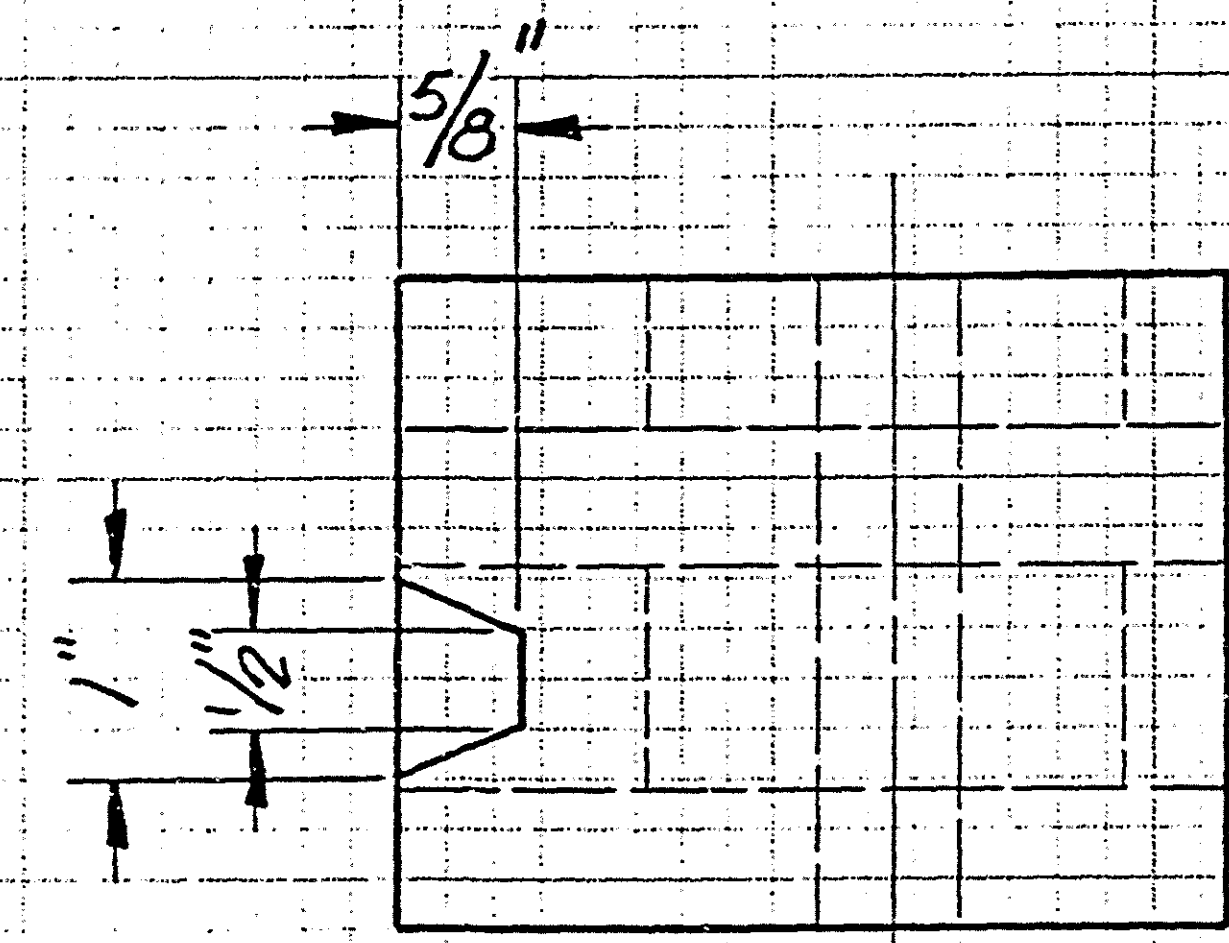
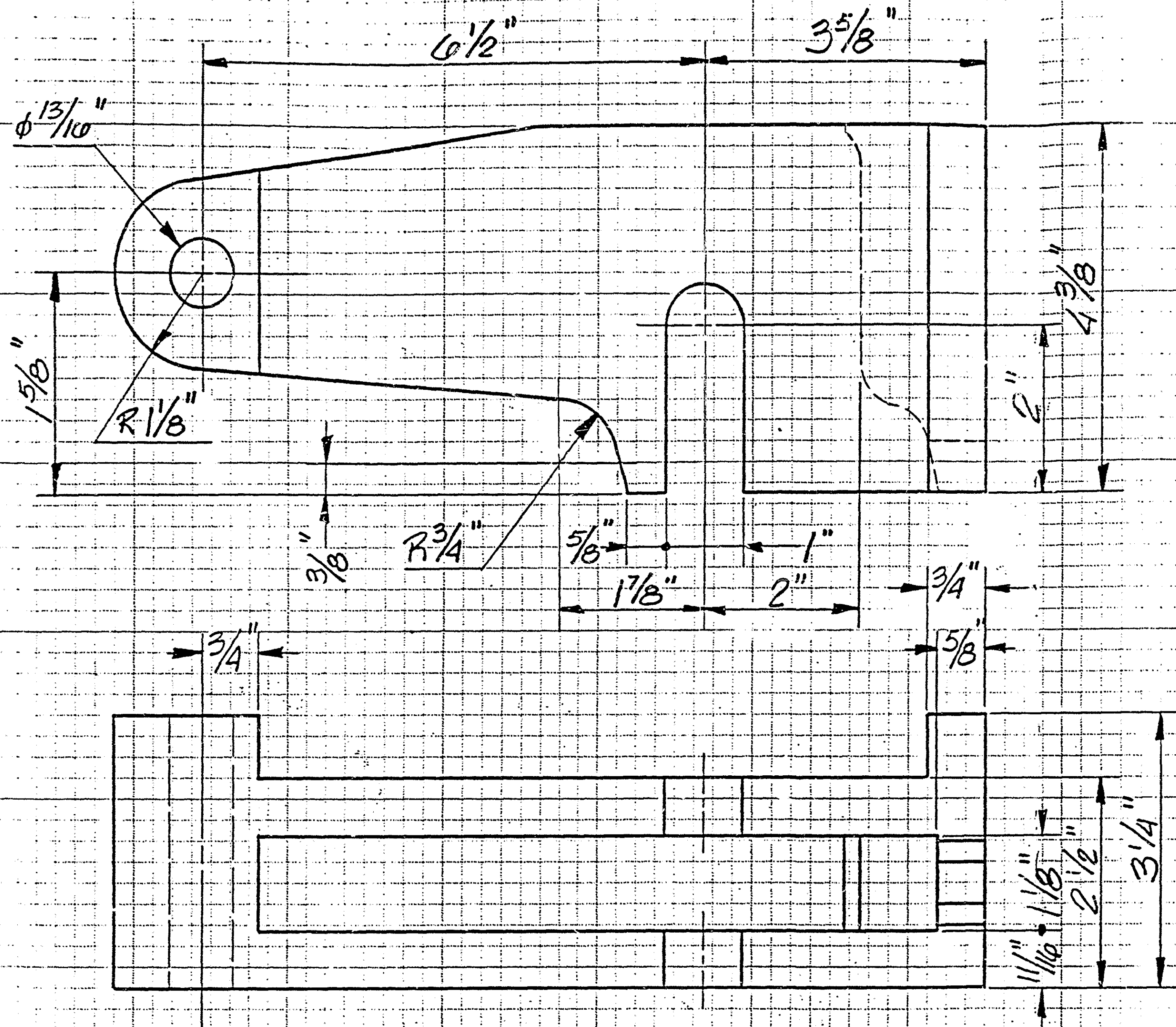
Projet Project
CANAL CHAMBLY
ECLUSE No.1-2-3
MECANISME DE VANNES

Titre du dessin Drawing Title
roue d'appui de la
cremailliere de
vanne
ru-c- 23. 161.4

Date 90-10-02

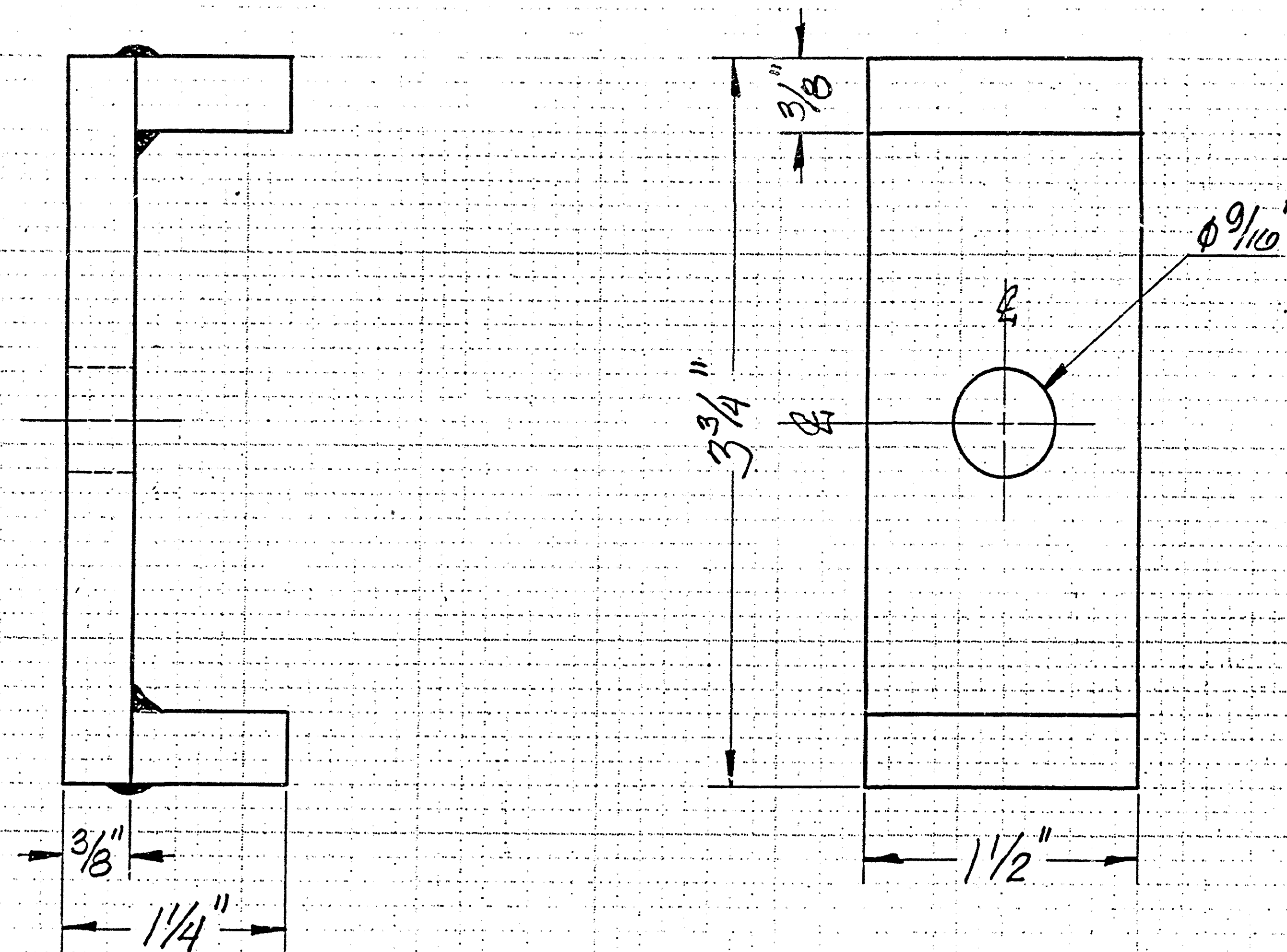
Echelle Scale
4/52
Sheet

No. de référence Reference no.



materiel
 fonte 4000 lbs
 de resistance

tendeur de la
 cremailiere
 ru-c-23-161.5



materiel
 acier laminé a chaud
 astm grad 1045



Environnement
 Canada
 Service Canadien
 des Parcs

Environment
 Canada
 Canadian Parks
 Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par Drawn by

Conçu par Design by

Vérifié par Checked by
 Azarie Lavigne
 Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain
 Azarie Lavigne

Chef de section Section head
 Jean-Claude Langlois

Gérant de secteur Area manager
 Pierre Parent

Projet Project

CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

Titre du dessin Drawing Title
 piece d appui de la
 vis de serrage du ten
 deur de la cremail
 le
 ru-c-23-161.6

Date 90-10-02

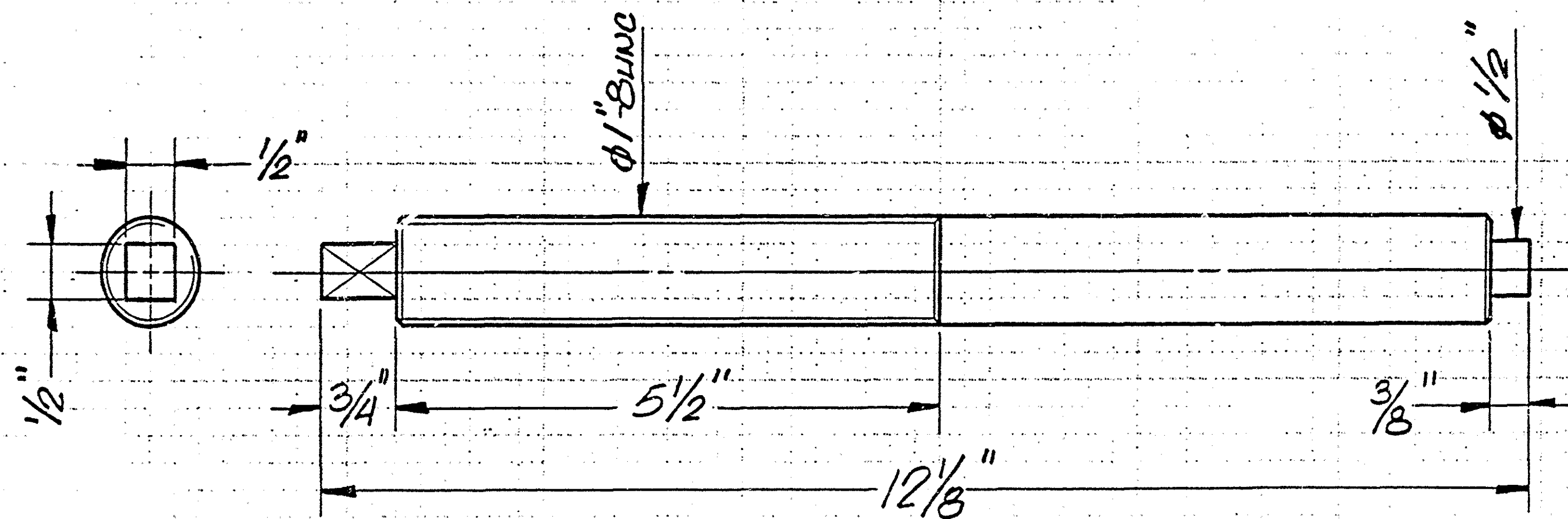
Echelle Scale 6/52 Sheet

No. de référence Reference no.



Environnement
Canada
Service Canadien
des Parcs

Environment
Canada
Canadian Parks
Service



matériel
acier inoxydable
grade 304

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



Dessiné par Drawn by

Conçu par Design by

Vérifié par
Azarie Lavigne
Yvon Laframboise

Checked by

Approuvé par Approved by

Chargé du projet Job Captain

Azarie Lavigne

Chef de section Section head

Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

**vis du tendeur de
la cremailiere
ru- c- 23- 181.7**

Date
90-10-02

Feuille
7/52

Echelle Scale

Sheet

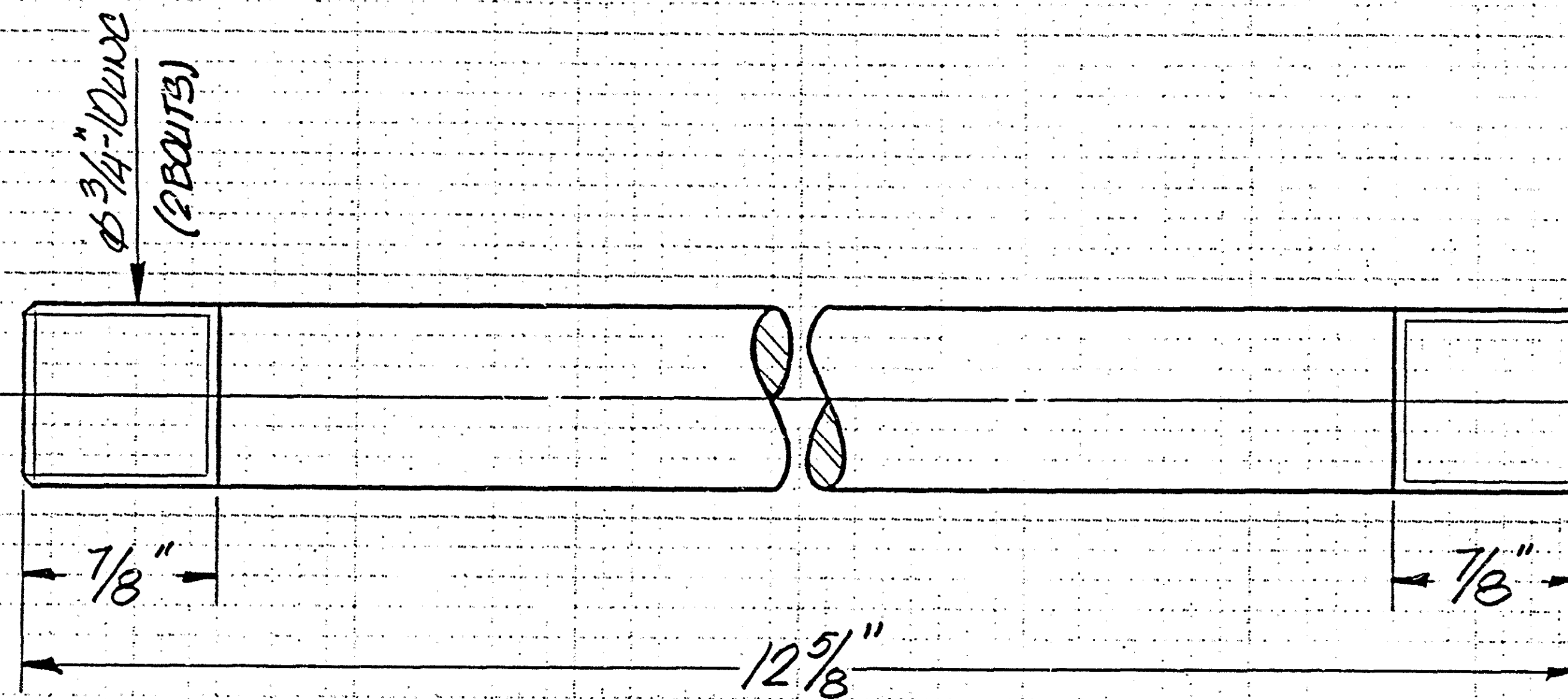
No. de référence

Reference no.



Environnement
Canada
Service Canadien
des Parcs

Environment
Canada
Canadian Parks
Service



materiel
acier laminé a chaud
1045

Modifications

A. No de détail	A B/C	A. Detail no
B. Localisation		B. Localisation
C. Sur feuille no		C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par
Azarie Lavigne
Yvon Laframboise

Checked by

Approuvé par _____ Approved by _____

Chargé du projet _____ Job Captain

Azarie Lavigne

Chef de section _____ Section head

Jean-Claude Langlois

Gérant de secteur _____ Area manager

Pierre Parent

Projet _____ Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin _____ Drawing Title

**boulon d assemblage
des cotés de vanne
ru-c-23-161.8**

Date
90-10-02

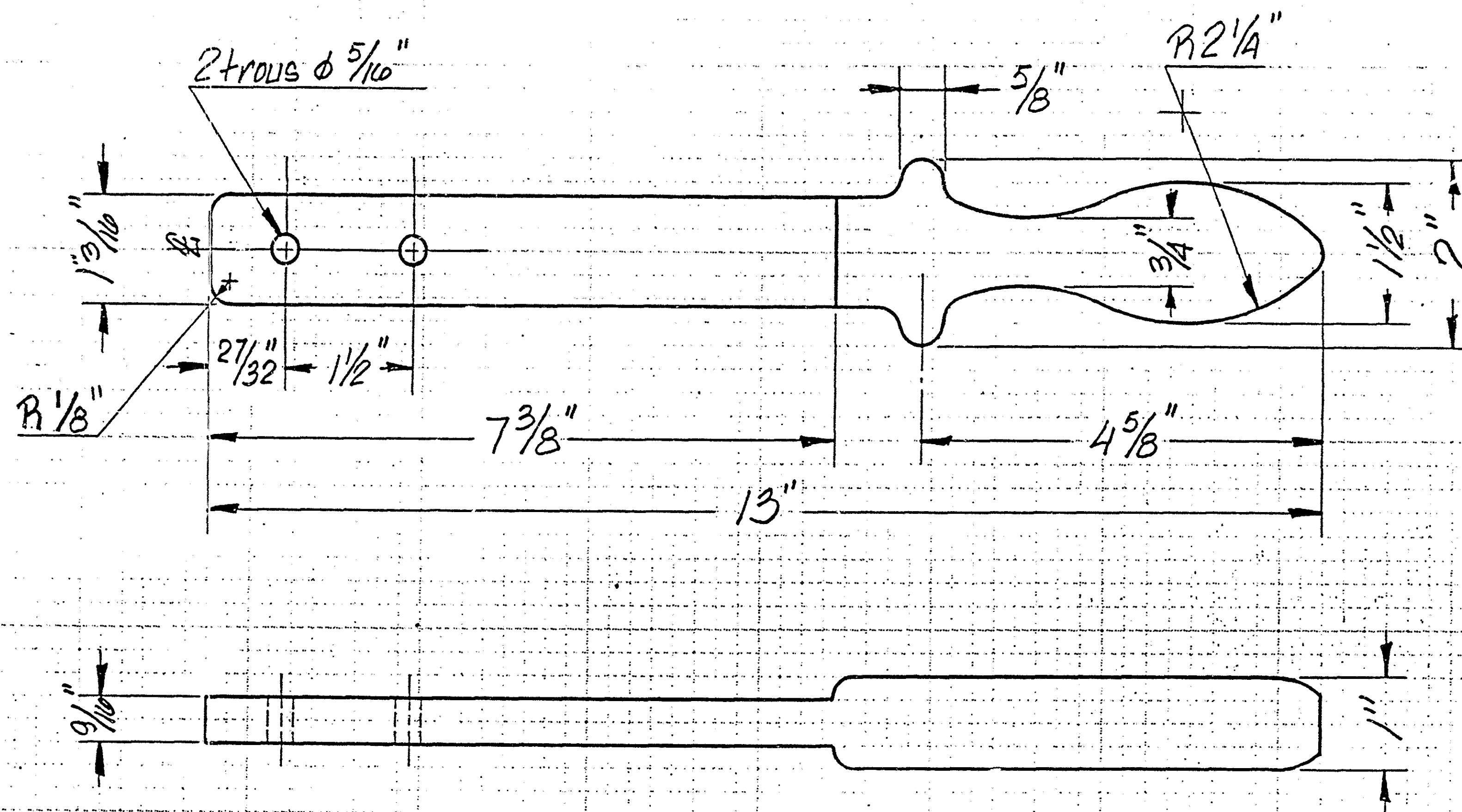
Feuille

Echelle _____ Scale

8/52
Sheet

No. de référence

Reference no.



MATERIEL
 FONTE DE 4000 lbs



Environnement Canada
 Service Canadien des Parcs

Environment Canada
 Canadian Parks Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Véifié par **Azarie Lavigne** / **Yvon Laframboise** Checked by

Approuvé par _____ Approved by _____

Chargé du projet **Azarie Lavigne** Job Captain

Chef de section **Jean-Claude Langlois** Section head

Gérant de secteur **Pierre Parent** Area manager

Projet **CANAL CHAMBLY**
ECLUSE No.1-2-3
MÉCANISME DE VANNES

Titre du dessin **BRAS DU FREIN A MAIN**
RU-C-23-161.9

Date **90-10-02**

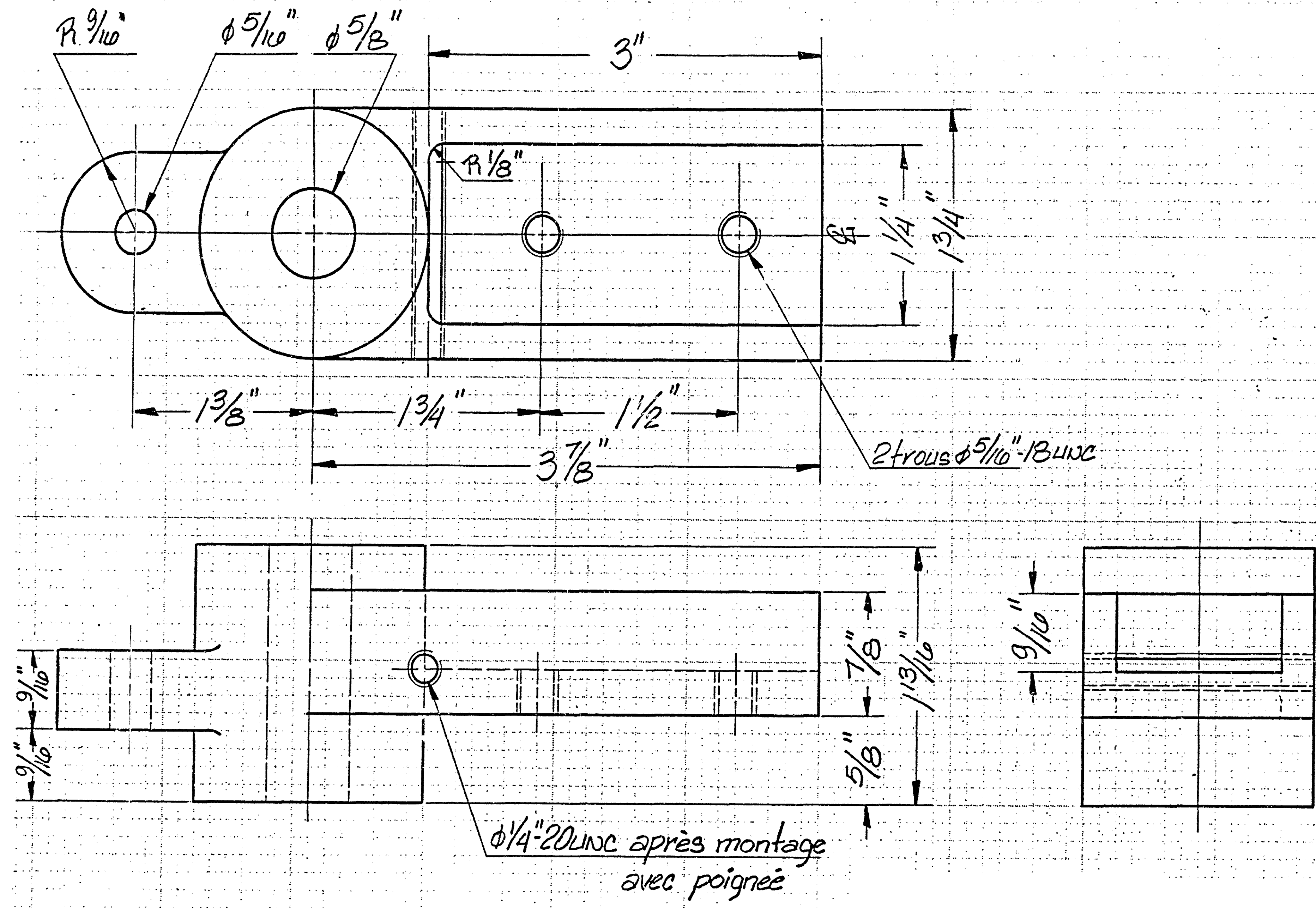
Echelle _____ Scale **9/52**
 Sheet

No. de référence _____ Reference no. _____



Environnement Canada
 Service Canadien des Parcs

Environment Canada
 Canadian Parks Service



MATERIEL
FRONTE 4000 LBS

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par Azarie Lavigne
Yvon Laframboise Checked by

Approuvé par _____ Approved by _____

Chargé du projet Azarie Lavigne Job Captain

Chef de section Jean-Claude Langlois Section head

Gérant de secteur Pierre Parent Area manager

Projet **CANAL CHAMBLY**
ECLUSE No.1-2-3
MECANISME DE VANNES

Titre du dessin **PIECE DU BRAS DU**
FREIN A MAIN
RU-C-23-16.10 Drawing Title

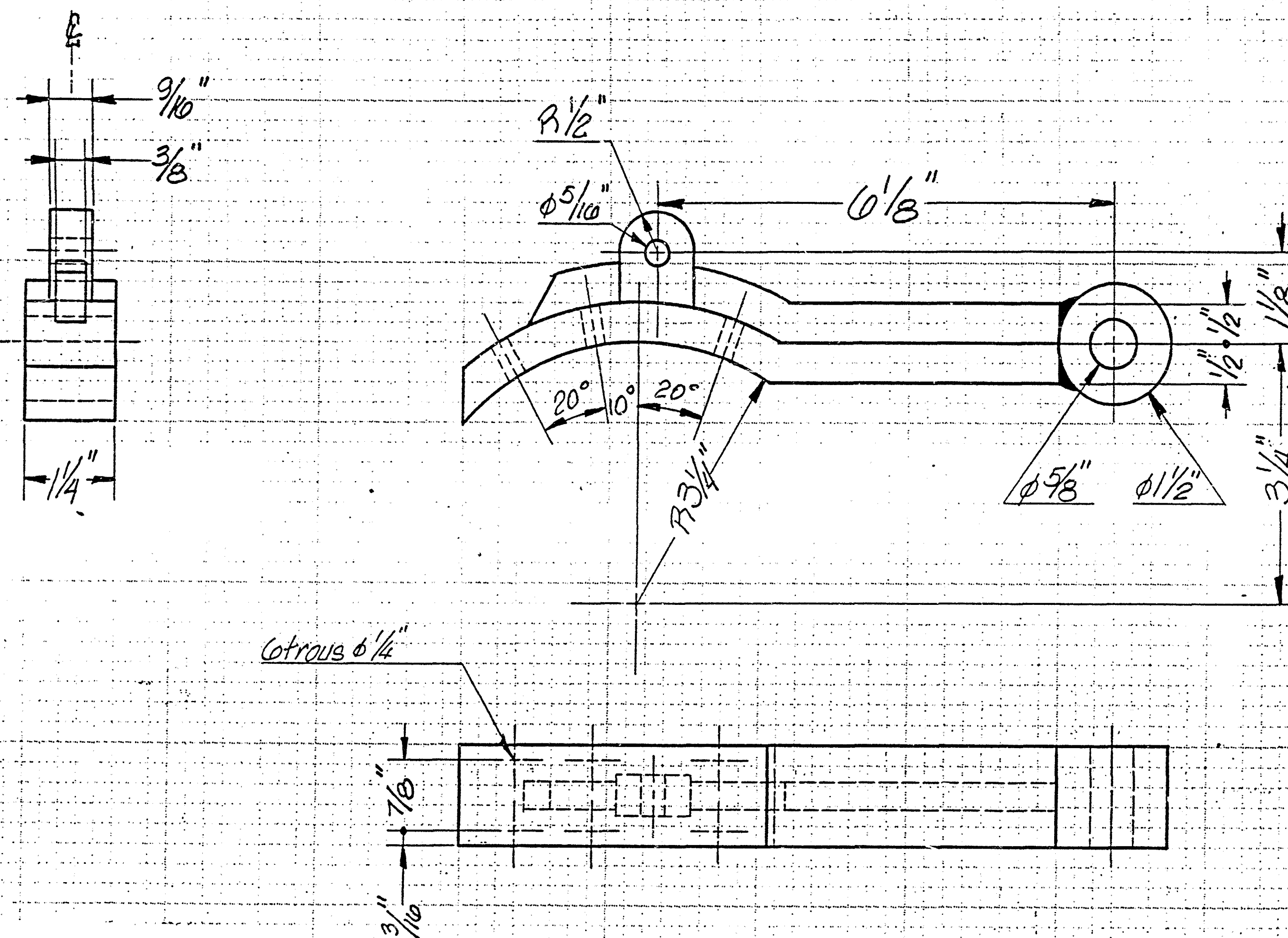
Date **90-10-02** Feuille **10/52**

Echelle _____ Scale _____

No. de référence _____ Reference no. _____



Environnement Canada / Environment Canada
 Service Canadien des Parcs / Canadian Parks Service



MATERIEL
 FONTE 4000 LBS
 DE RESISTANCE

Modifications
 A. No du détail / A. Detail no
 B. Localisation / B. Localisation
 C. Sur feuille no / C. On sheet no

Dessiné par / Drawn by

Conçu par / Design by

Vérifié par / Checked by
 Azarie Lavigne
 Yvon Laframboise

Approuvé par / Approved by

Chargé du projet / Job Captain
 Azarie Lavigne

Chef de section / Section head
 Jean-Claude Langlois

Gérant de secteur / Area manager
 Pierre Parent

Projet / Project
 CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

Titre du dessin / Drawing Title
 MACHOIRE DU FREIN
 A MAIN
 RU-C-23-16/11

Date / Feuille
 90-10-02 / 11/52

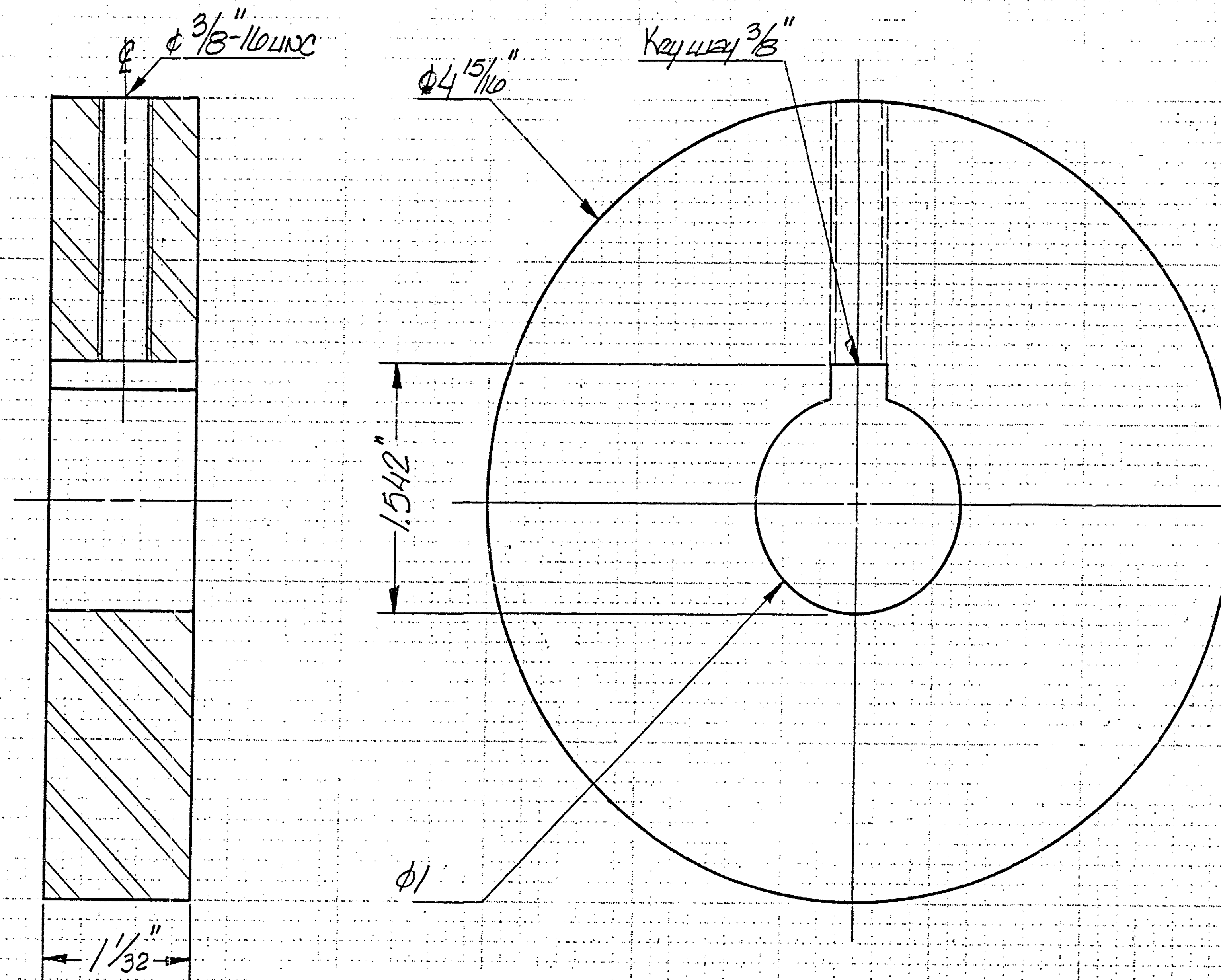
Echelle / Scale
 / Sheet

No. de référence / Reference no.



Environnement
Canada
Service Canadien
des Parcs

Environment
Canada
Canadian Parks
Service



MATERIEL
ACIER LAMINE A CHAUD
GRADE 1045

Modifications

A. No du detail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par Drawn by

Conçu par Design by

Vérifié par Checked by
Azarie Lavigne
Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain

Azarie Lavigne

Chef de section Section head

Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

DISQUE DU FREIN

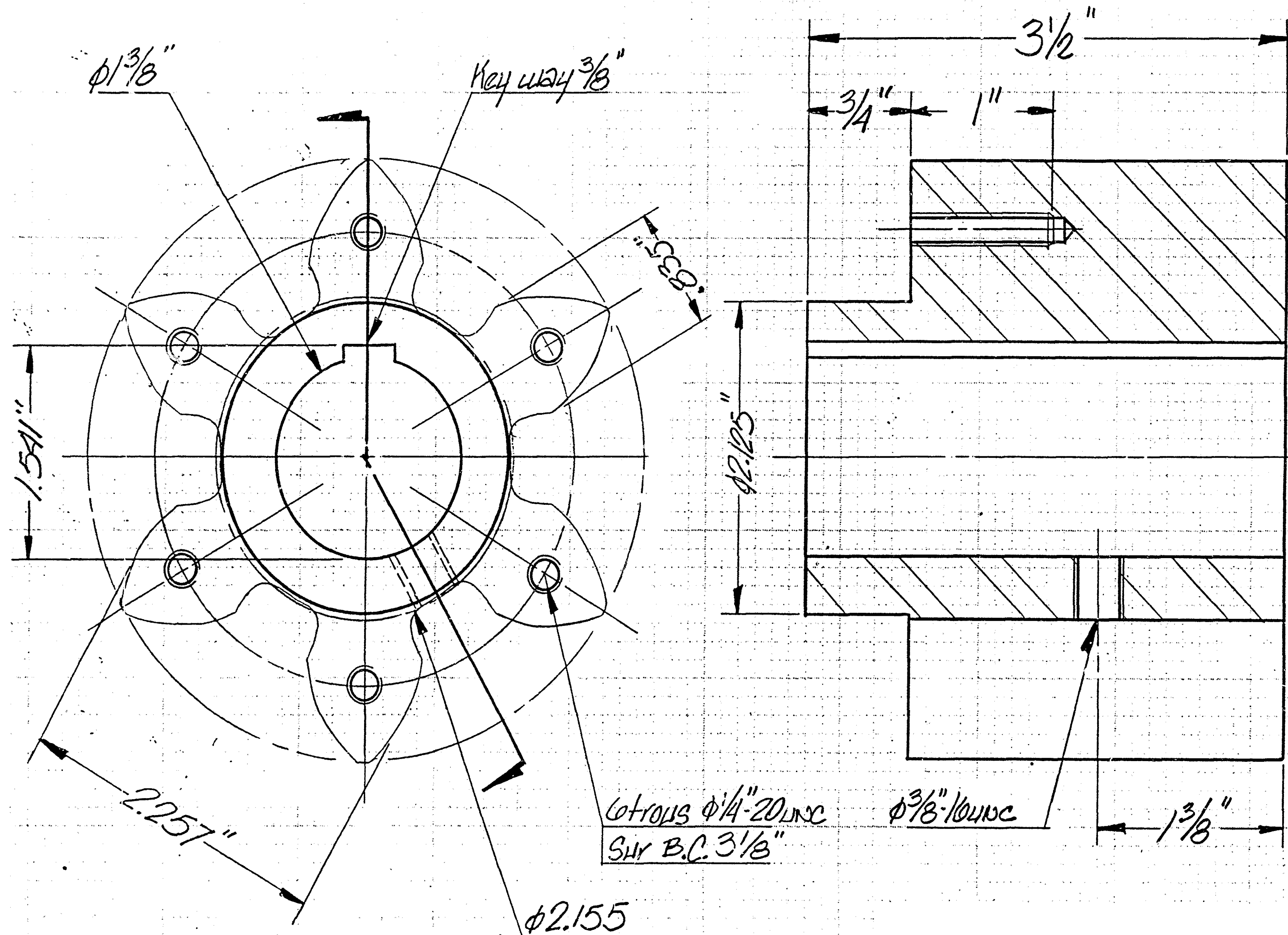
A MAIN

RU-C-23-16/12

Date 90-10-02

Echelle Scale 12/152 Sheet

No. de référence Reference no.



MATERIEL
 ACIER LAMINE A FROID
 1020



Environnement Canada
 Service Canadien des Parcs

Environment Canada
 Canadian Parks Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par **Azarie Lavigne** / **Yvon Laframboise** Checked by

Approuvé par _____ Approved by _____

Chargé du projet **Azarie Lavigne** Job Captain

Chef de section **Jean-Claude Langlois** Section head

Gérant de secteur **Pierre Parent** Area manager

Projet **CANAL CHAMBLY**
ECLUSE No.1-2-3
MECANISME DE VANNES

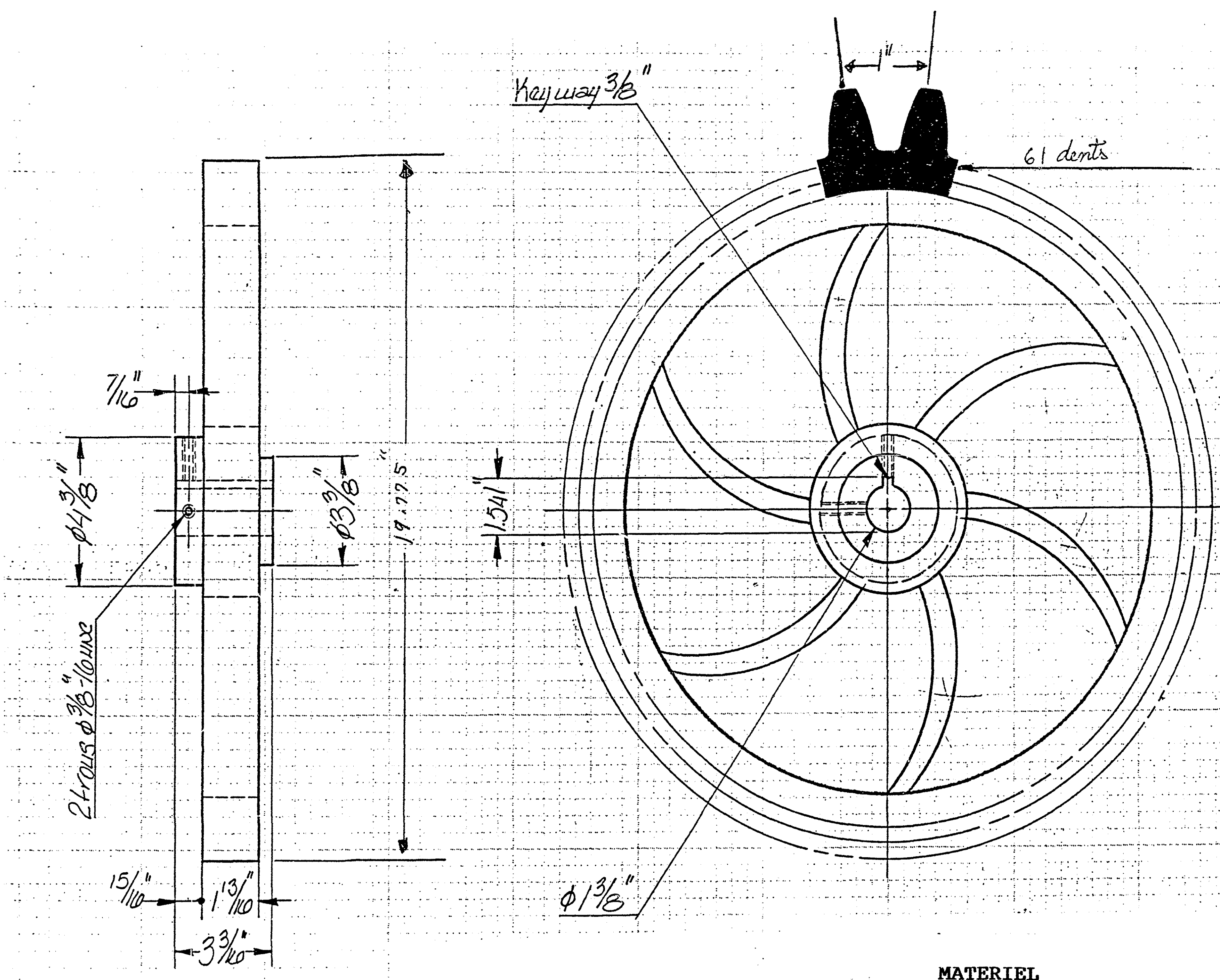
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RU-C-23-161.13 Drawing Title

Date **90-10-02** Feuille **13/52**
 Echelle _____ Scale _____ Sheet

No. de référence _____ Reference no. _____



Environnement Canada
 Environment Canada
 Service Canadien des Parcs
 Canadian Parks Service



MATERIEL
 FONTE 4000 LBS
 DE RÉSISTANCE

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Véifié par
 Azarie Lavigne
 Yvon Laframboise

Checked by

Approuvé par _____ Approved by _____

Chargé du projet
 Azarie Lavigne

Job Captain

Chef de section
 Jean-Claude Langlois

Section head

Gérant de secteur
 Pierre Parent

Area manager

Projet
 CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

Project

Titre du dessin
 ROUE D ENGRENAGE
 A 6 DENTS
 RU-C-23-161.14

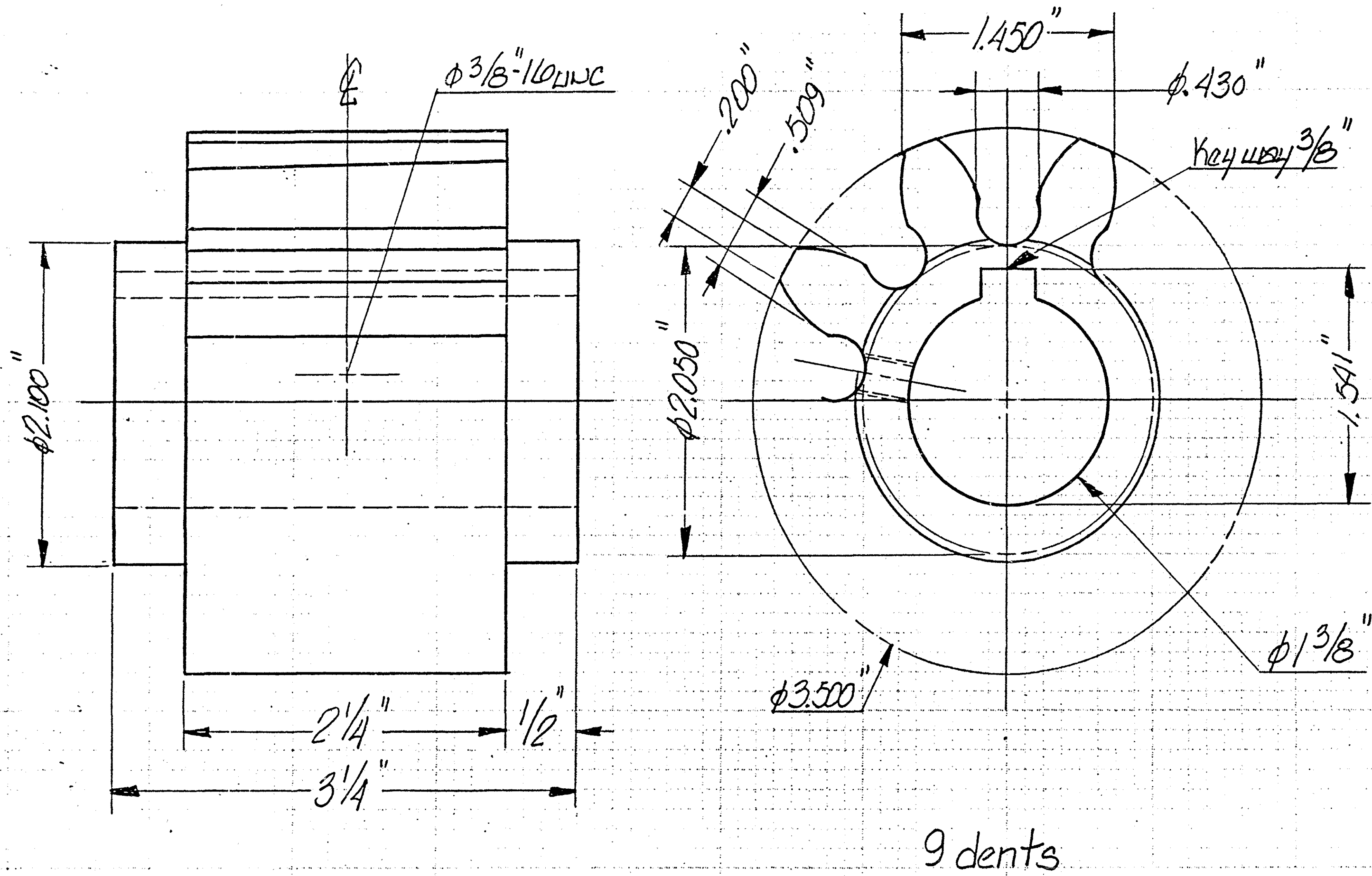
Drawing Title

Date
 90-10-02

Feuille
 14/

Echelle
 Scale
 1/52
 Sheet

No. de référence
 Reference no.



MATERIEL
ACIER LAMINÉ A FROID
GRADE 1020

Environnement Canada
 Service Canadien des Parcs
 Environment Canada
 Canadian Parks Service

Modifications	
A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par **Azarie Lavigne**
Yvon Laframboise
 Checked by

Approuvé par _____ Approved by _____

Chargé du projet **Azarie Lavigne**
 Job Captain

Chef de section **Jean-Claude Langlois**
 Section head

Gérant de secteur **Pierre Parent**
 Area manager

Projet **CANAL CHAMBLY**
ECLUSE No.1-2-3
MECANISME DE VANNES
 Project

Titre du dessin **ROUE D ENGRENAGE**
A 9 DENTS
RU-C- 23- 168.15
 Drawing Title

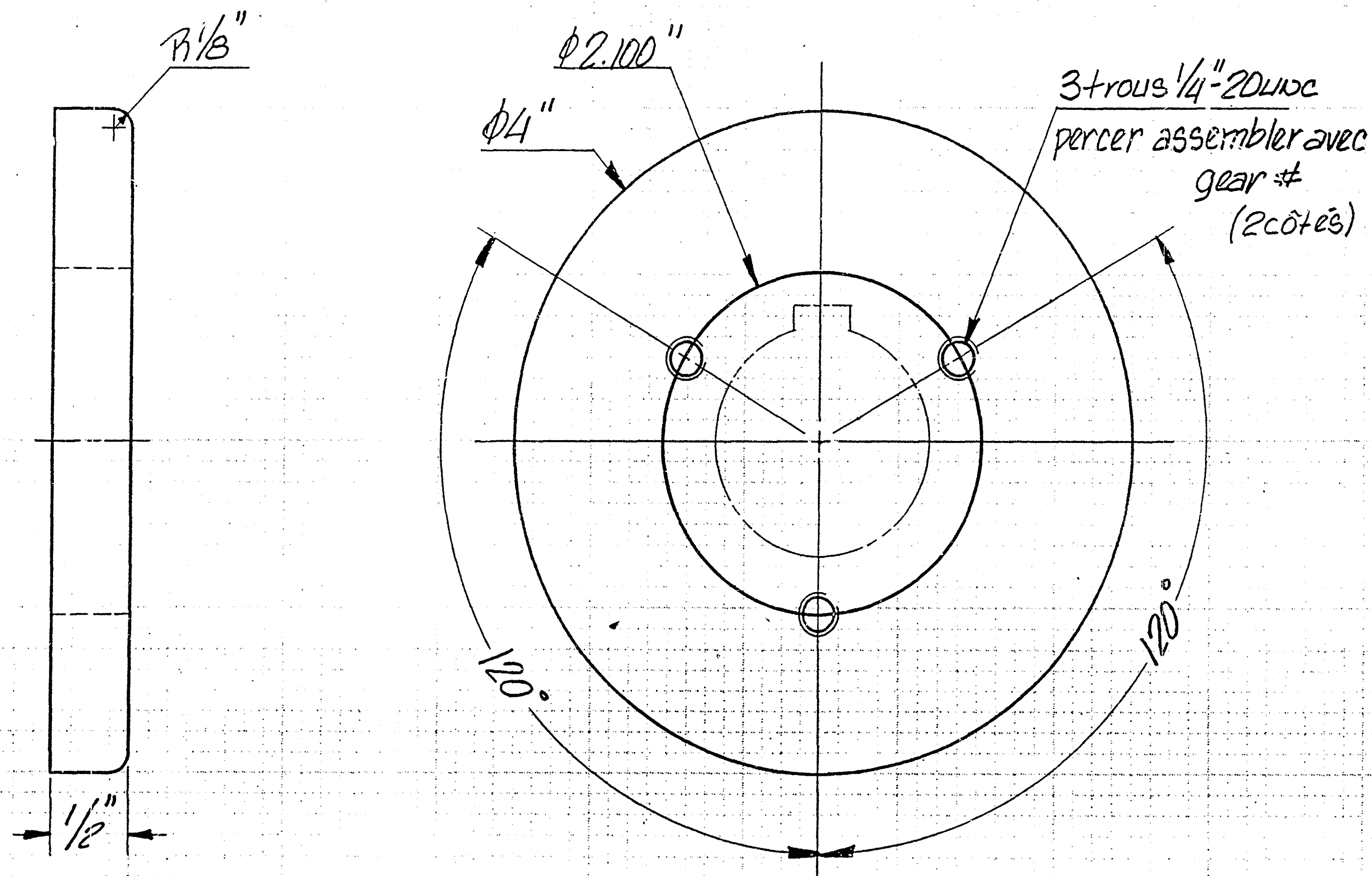
Date **90-10-02**
 Feuille **107**
 Echelle _____ Scale _____
 Sheet **52**

No. de référence _____ Reference no. _____



Environnement
Canada
Service Canadien
des Parcs

Environment
Canada
Canadian Parks
Service



MATERIEL
ACIER LAMINÉ A FROID
1020

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par
Azarie Lavigne
Yvon Laframboise

Checked by

Approuvé par _____ Approved by _____

Chargé du projet _____ Job Captain

Azarie Lavigne

Chef de section _____ Section head

Jean-Claude Langlois

Gérant de secteur _____ Area manager

Pierre Parent

Projet _____ Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin _____ Drawing Title

**COTÉ DE LA ROUE D EN
GRENAGE A 9 DENTS
RU-C-23-161/6**

Date
90-10-02

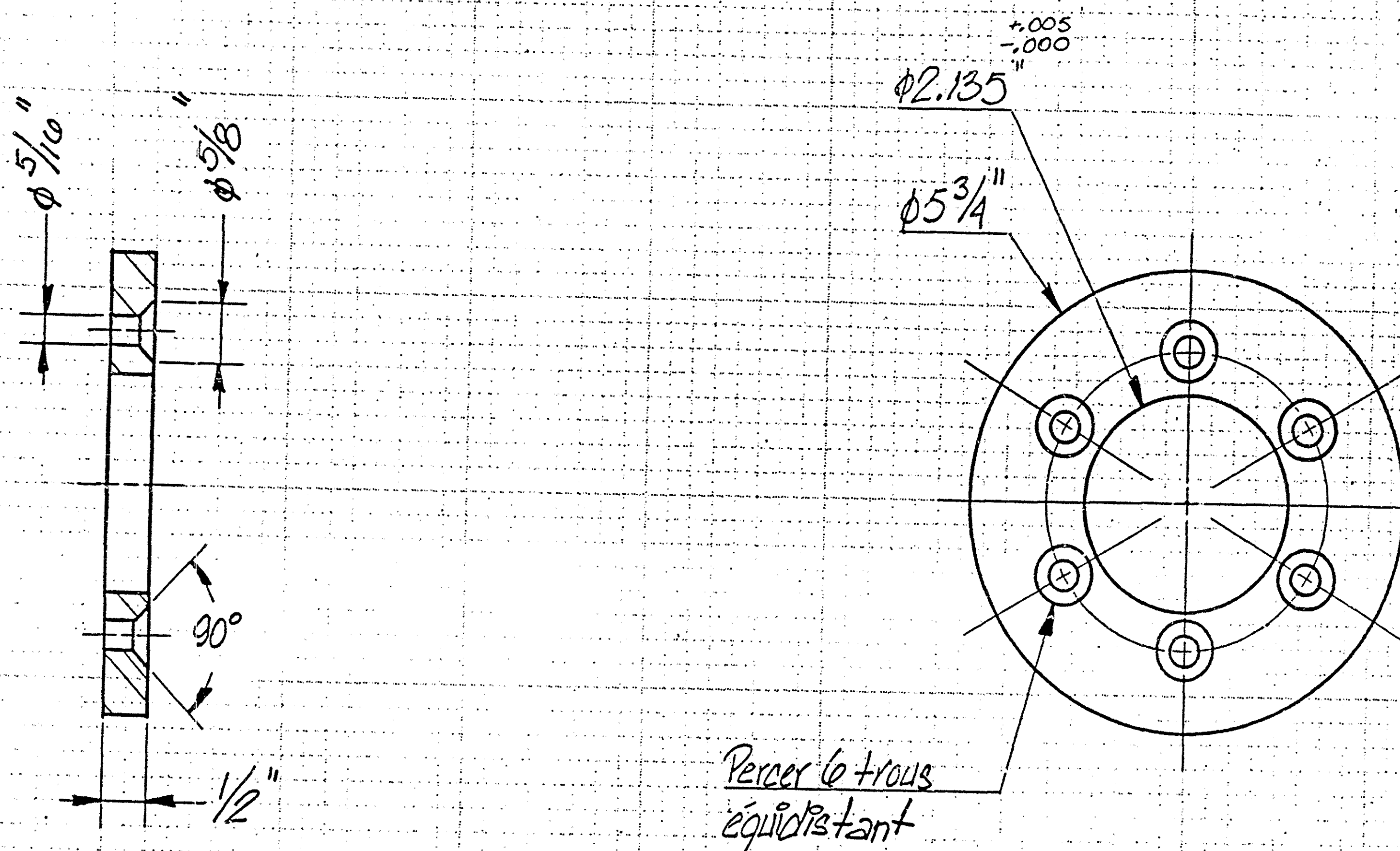
Feuille
16/

Echelle _____ Scale
Sheet

No. de référence _____ Reference no.



Environnement Canada
 Environment Canada
 Service Canadien des Parcs
 Canadian Parks Service



MATERIEL
 ACIER LAMINÉ A FROID
 1020

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par **Azarie Lavigne**
Yvon Laframboise Checked by

Approuvé par _____ Approved by _____

Chargé du projet **Azarie Lavigne** Job Captain

Chef de section **Jean-Claude Langlois** Section head

Gérant de secteur **Pierre Parent** Area manager

Projet **CANAL CHAMBLY**
ECLUSE No.1-2-3
MECANISME DE VANNES Project

Titre du dessin **COTÉ DE LA ROUE D EN**
GRENAGE A 6 DENTS
RU-C-23-16/17 Drawing Title

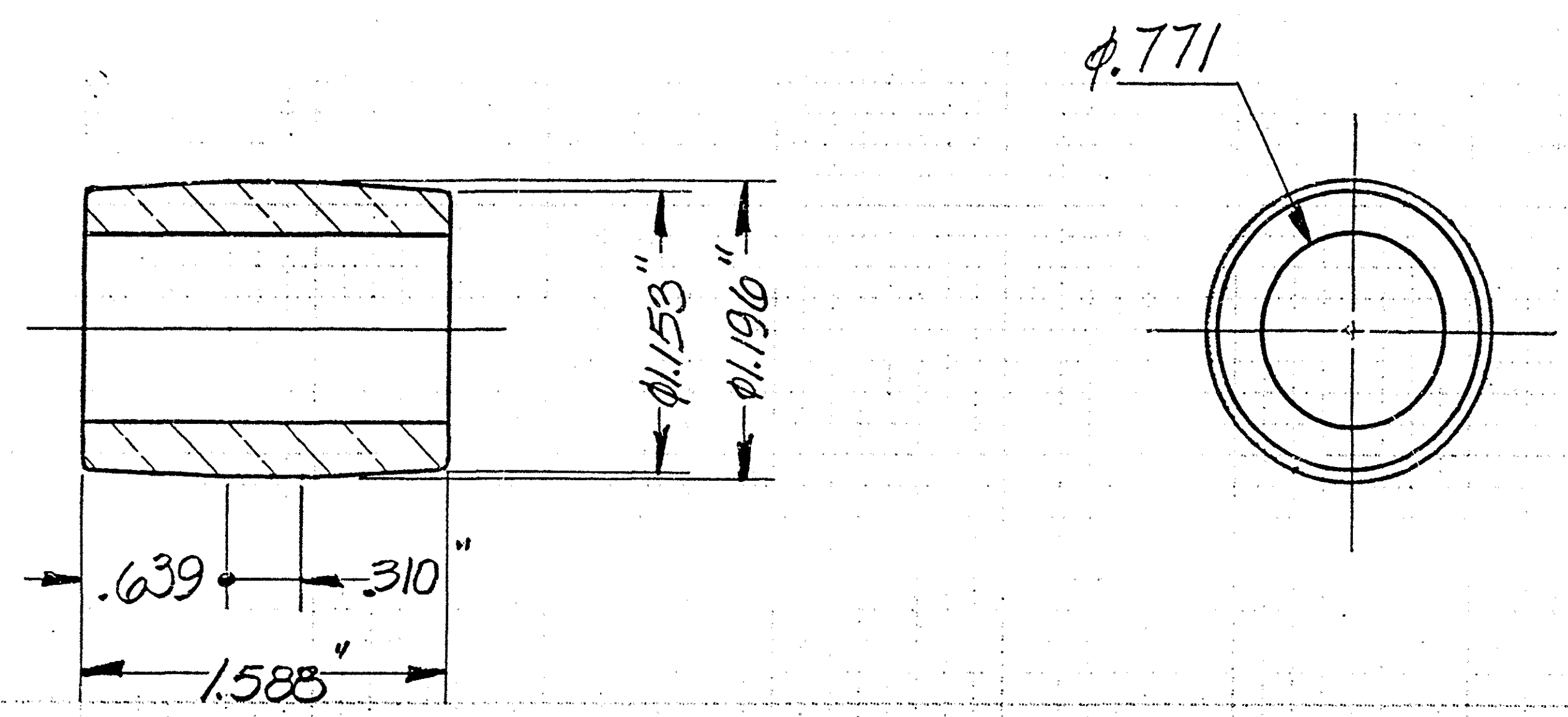
Date **90-10-02** Feuille **17/52**

Echelle _____ Scale _____ Sheet

No. de référence _____ Reference no. _____



Environnement Canada
 Environment Canada
 Service Canadien des Parcs
 Canadian Parks Service



MATERIEL
 BRONZE A COUSSINET
 660

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par Azarie Lavigne Checked by
Yvon Laframboise

Approuvé par _____ Approved by _____

Chargé du projet Azarie Lavigne Job Captain

Chef de section Jean-Claude Langlois Section head

Gérant de secteur Pierre Parent Area manager

Projet **CANAL CHAMBLY**
ECLUSE No.1-2-3
MECANISME DE VANNES

Titre du dessin **COUSSINET DE BRONZE** Drawing Title

RU-C-23-161.18

Date **90-10-02** Feuille **18/52**

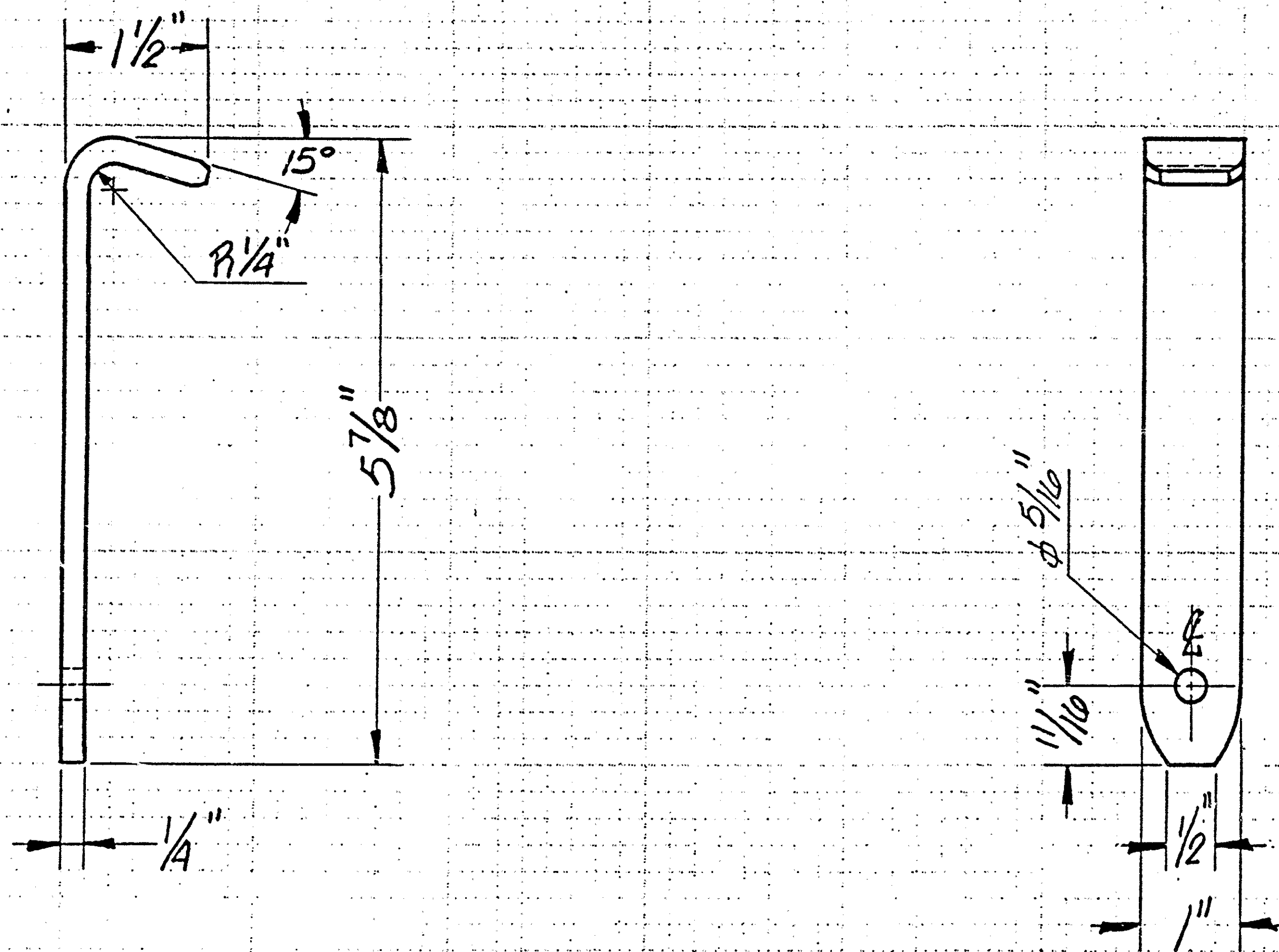
Echelle _____ Scale _____ Sheet

No. de référence _____ Reference no. _____



Environnement
Canada
Service Canadien
des Parcs

Environment
Canada
Canadian Parks
Service



MATERIEL
ACIER LAMINE A
CHAUD 1045

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



Dessiné par Drawn by

Conçu par Design by

Vérifié par
Azarie Lavigne
Yvon Laframboise

Checked by

Approuvé par Approved by

Chargé du projet Job Captain

Azarie Lavigne

Chef de section Section head

Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

**BARRURE POUR
CREMAILLIERE**

RU-C-23-161.19

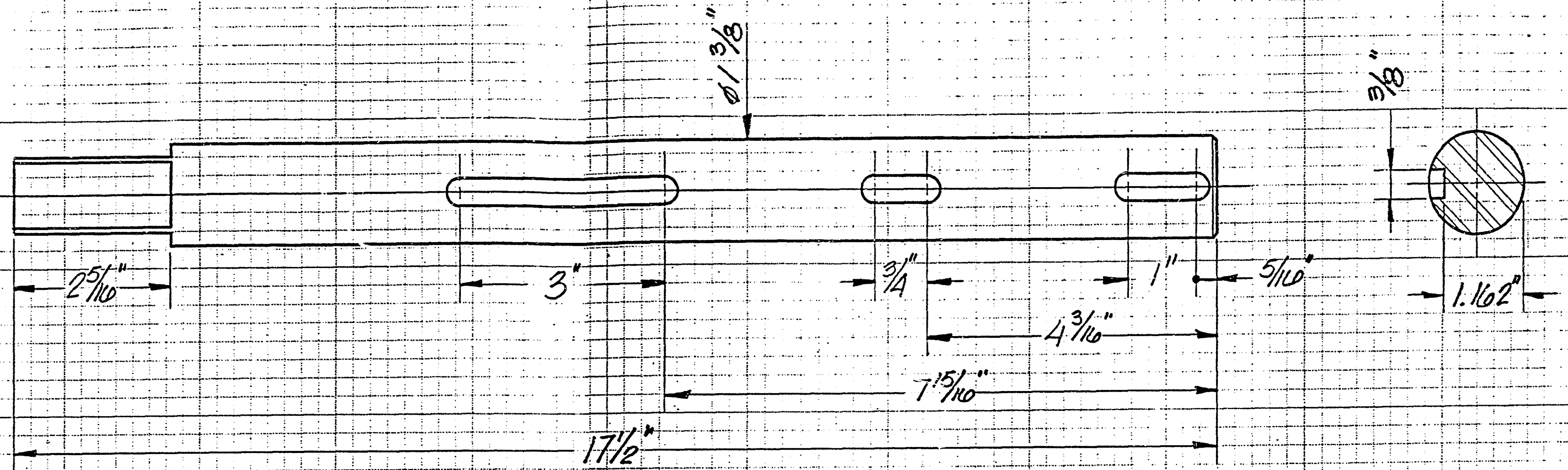
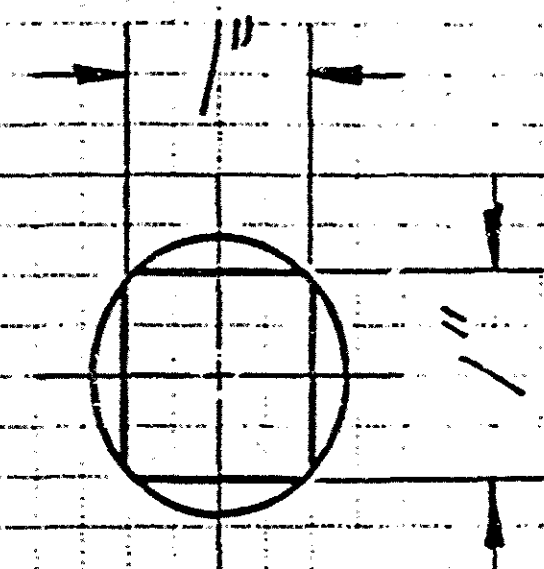
Date
90-10-02

Feuille
19/
152
Sheet

Echelle Scale

No. de référence

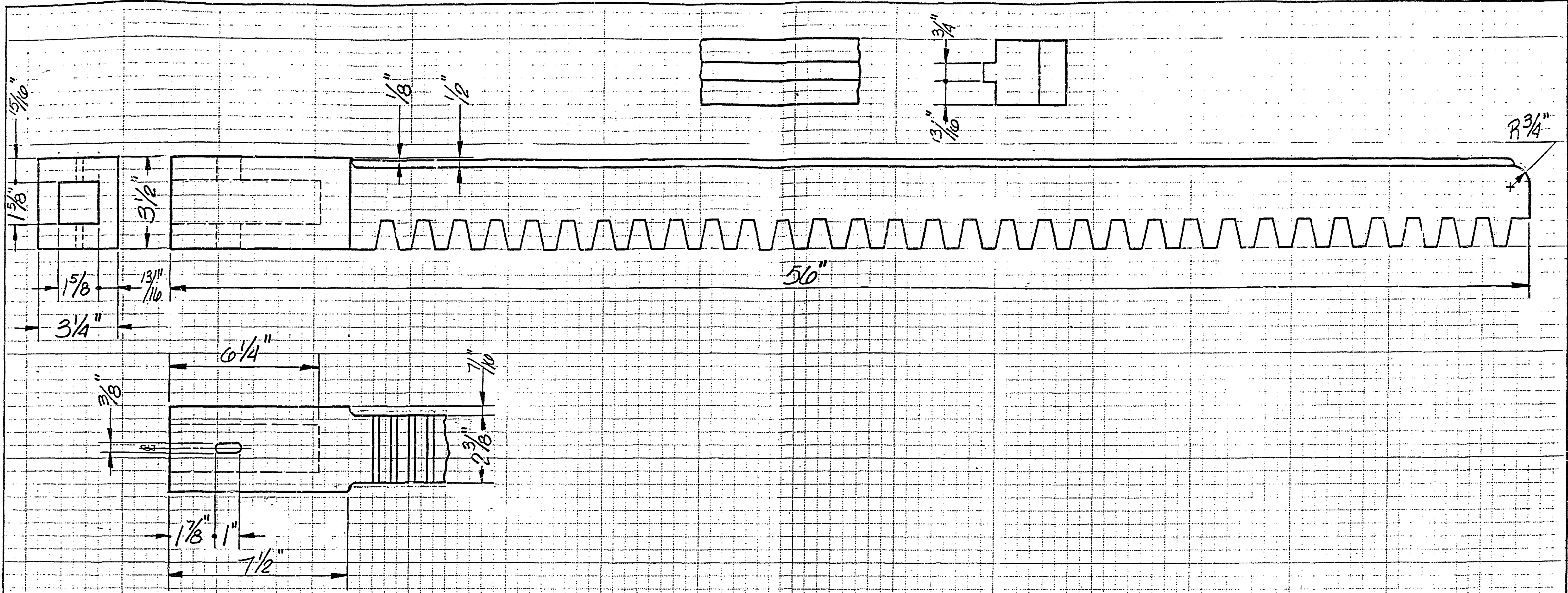
Reference no.



MATERIEL
 ACIER LAMINE A
 FROID 1020

ARBRE DE COUCHE
 RU-C-23-16.20

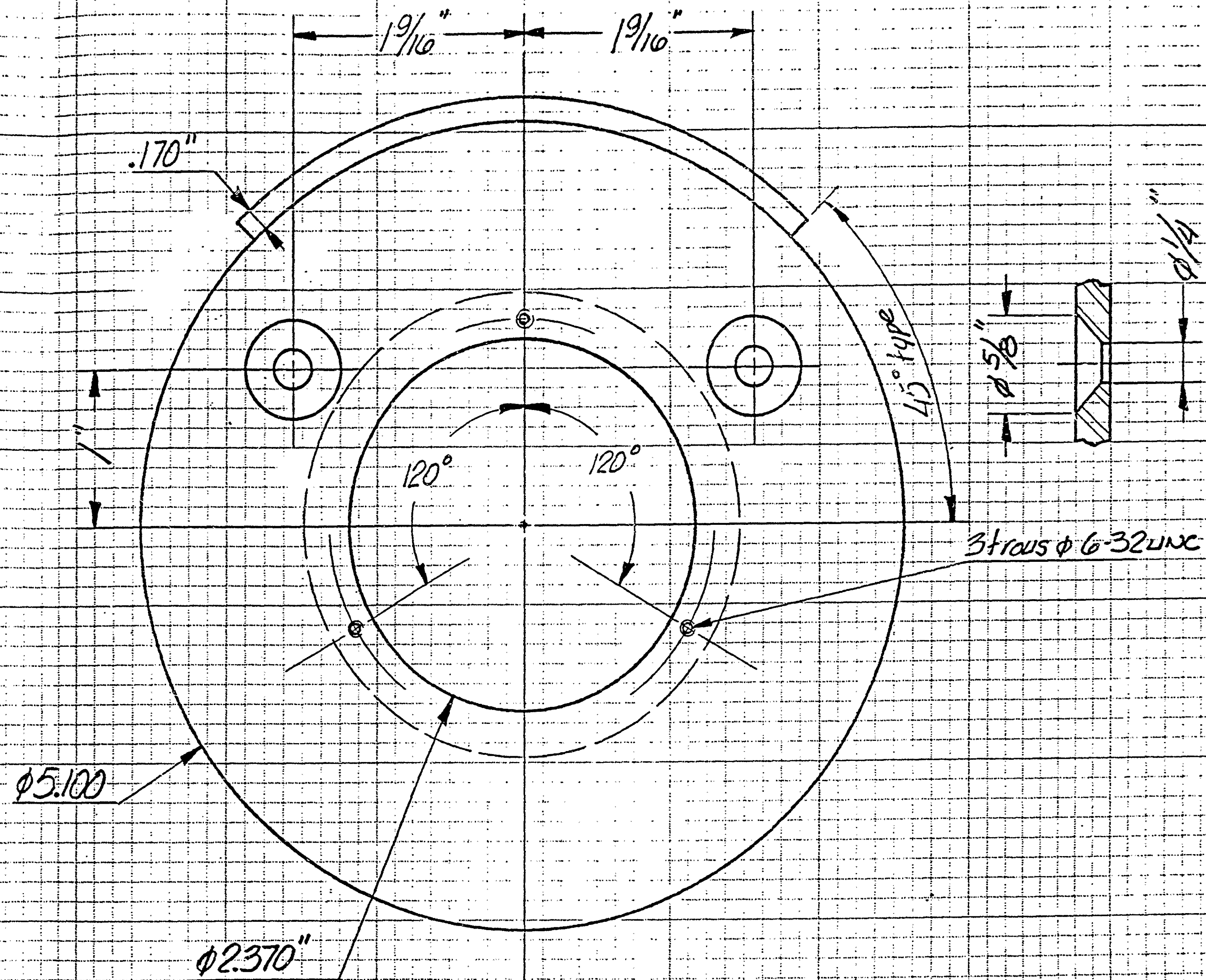
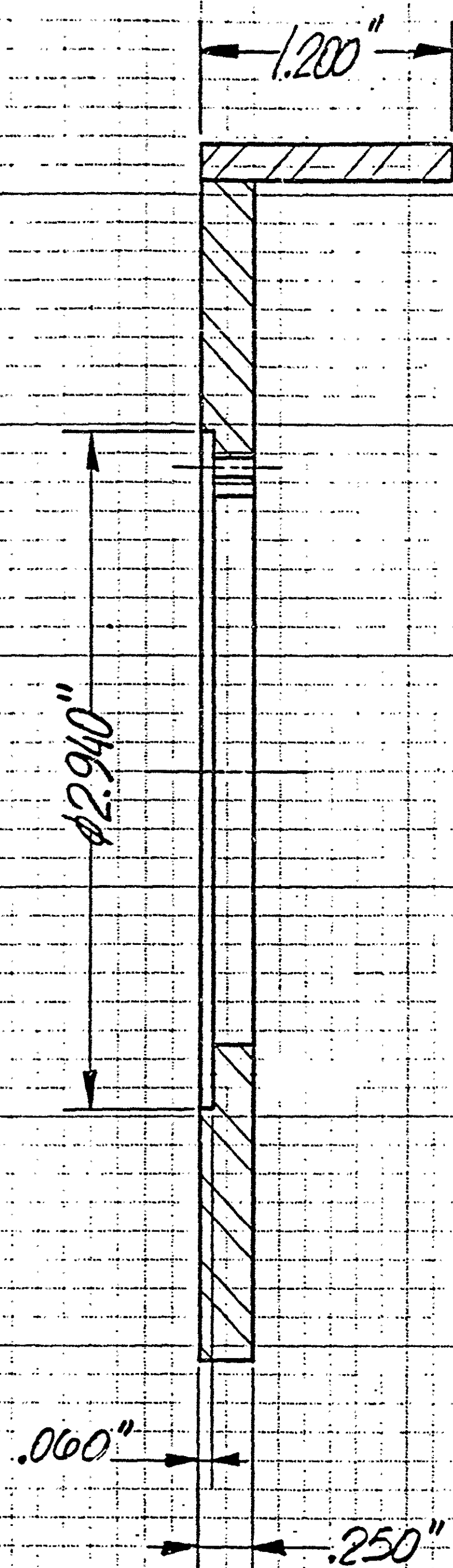
20/52



MATERIEL
FONTE 40000 LBS DE
RESISTANCE

CREMAILLIERE
RU-C-23-16121

24/52

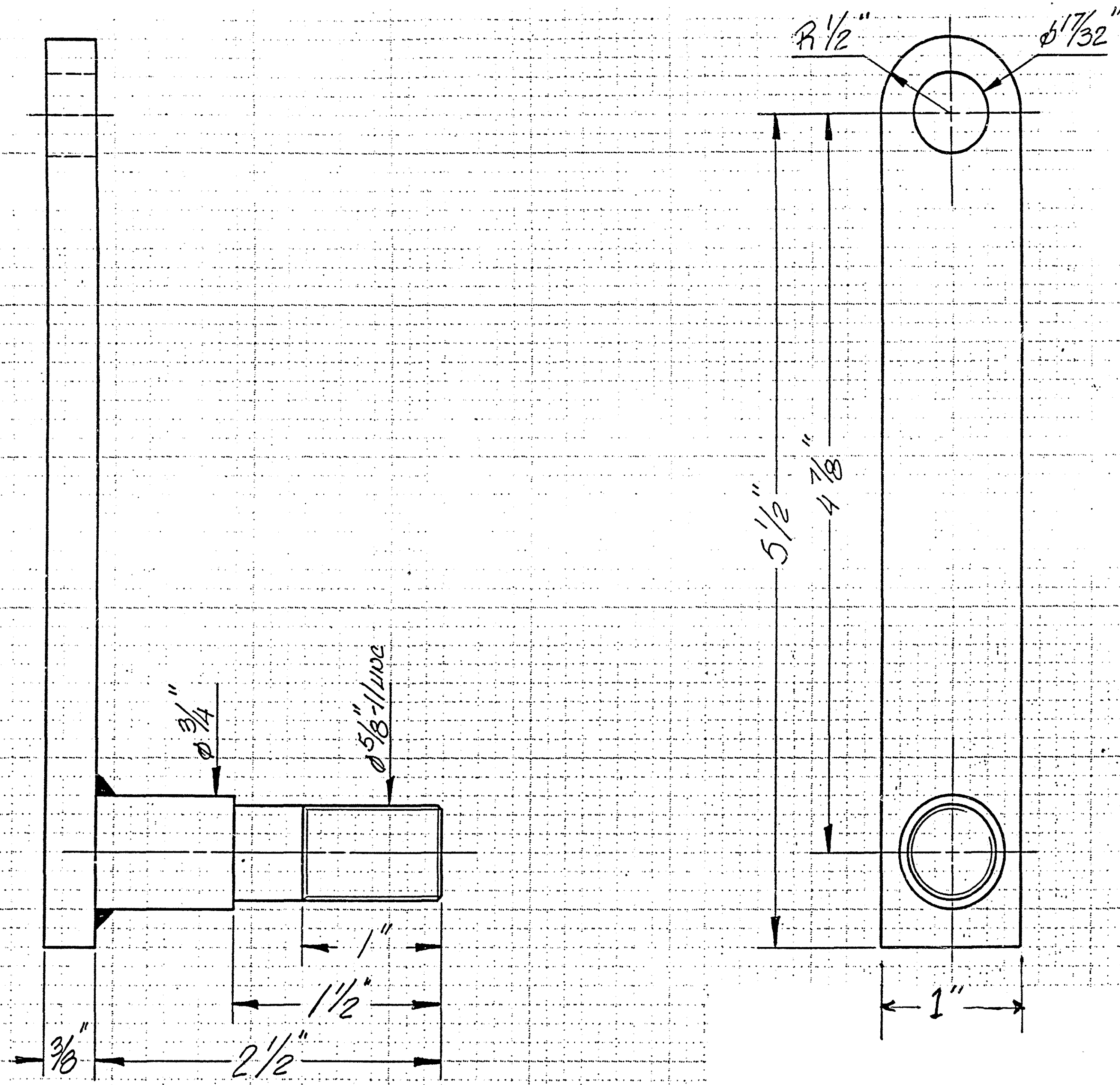


MATERIEL
ACIER LAMINE A
CHAUD C-1020

PIECE ANTI-RECALE
RU-C-23-161.22



Environnement Canada
 Environment Canada
 Service Canadien des Parcs
 Canadian Parks Service



MATERIEL
 ACIER LAMINE A
 CHAUD 1045

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par Azarie Lavigne
Yvon Laframboise Checked by _____

Approuvé par _____ Approved by _____

Chargé du projet Azarie Lavigne Job Captain

Chef de section Jean-Claude Langlois Section head

Gérant de secteur Pierre Parent Area manager

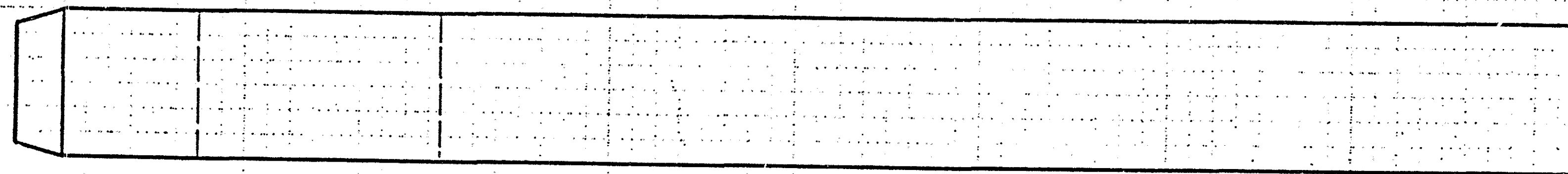
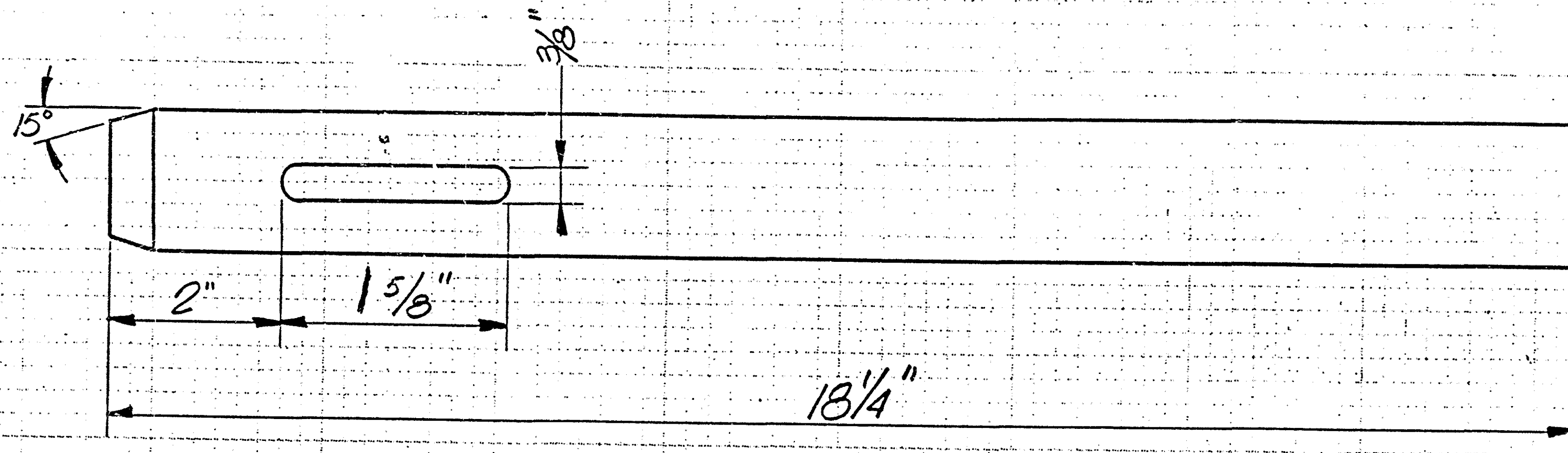
Projet CANAL CHAMBLY
ECLUSE No.1-2-3
MECANISME DE VANNES Project

Titre du dessin BARRURE DU MECANISME
RU-C-23-61.23 Drawing Title

Date 90-10-02 Feuille 23/

Echelle _____ Scale 1/52
 Sheet

No. de référence _____ Reference no. _____



MATERIEL
ACIER LAMINE A
CHAUD 1045



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Canada
Canadian Parks
Service

Modifications

A. No du détail	A B/C	A. Detail no
B. Localisation		B. Localisation
C. Sur feuille no		C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Véifié par **Azarie Lavigne** Checked by
Yvon Laframboise

Approuvé par _____ Approved by _____

Chargé du projet **Azarie Lavigne** Job Captain

Chef de section **Jean-Claude Langlois** Section head

Gérant de secteur **Pierre Parent** Area manager

Projet **CANAL CHAMBLY** Project
ECLUSE No.1-2-3
MECANISME DE VANNES

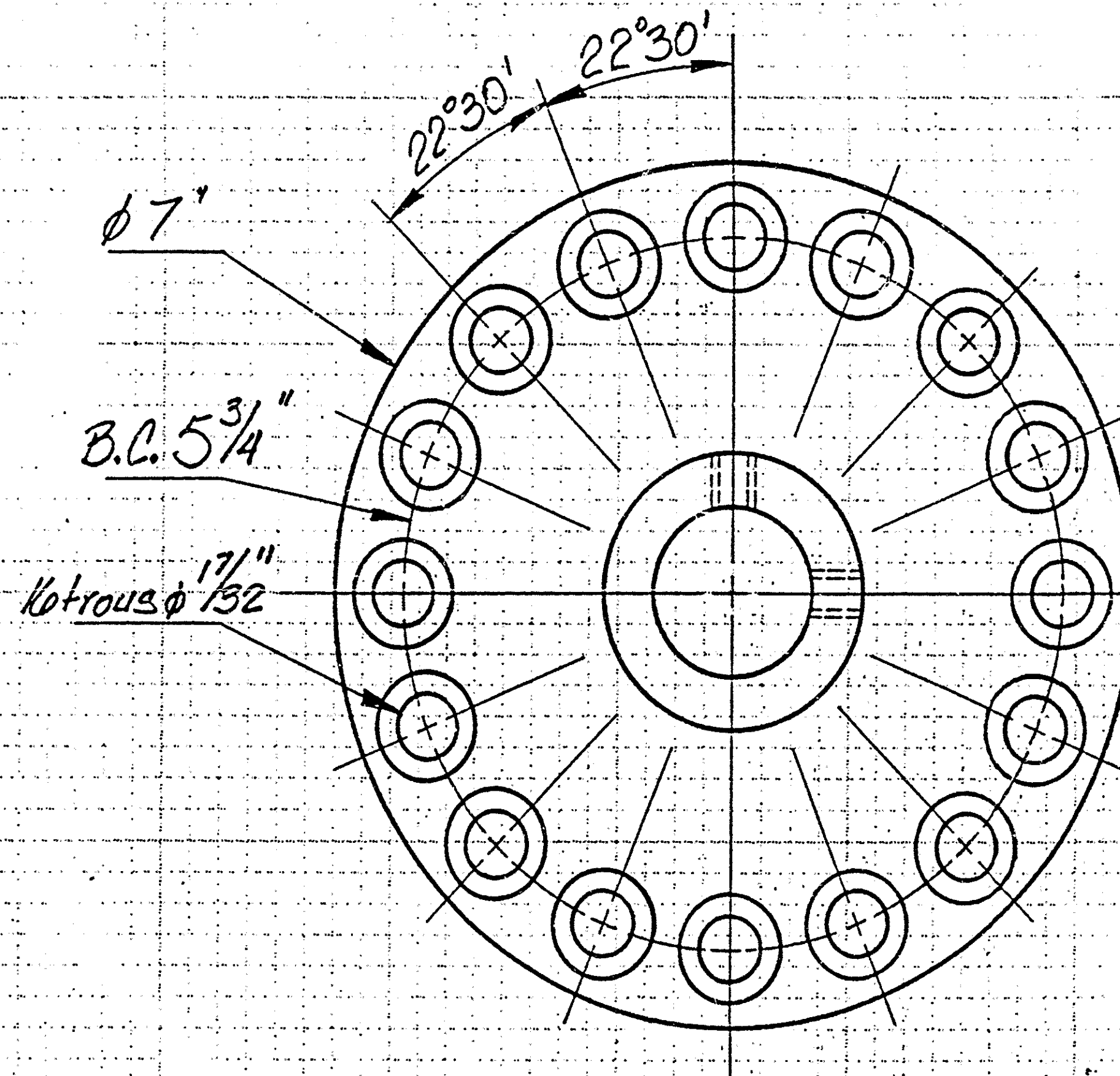
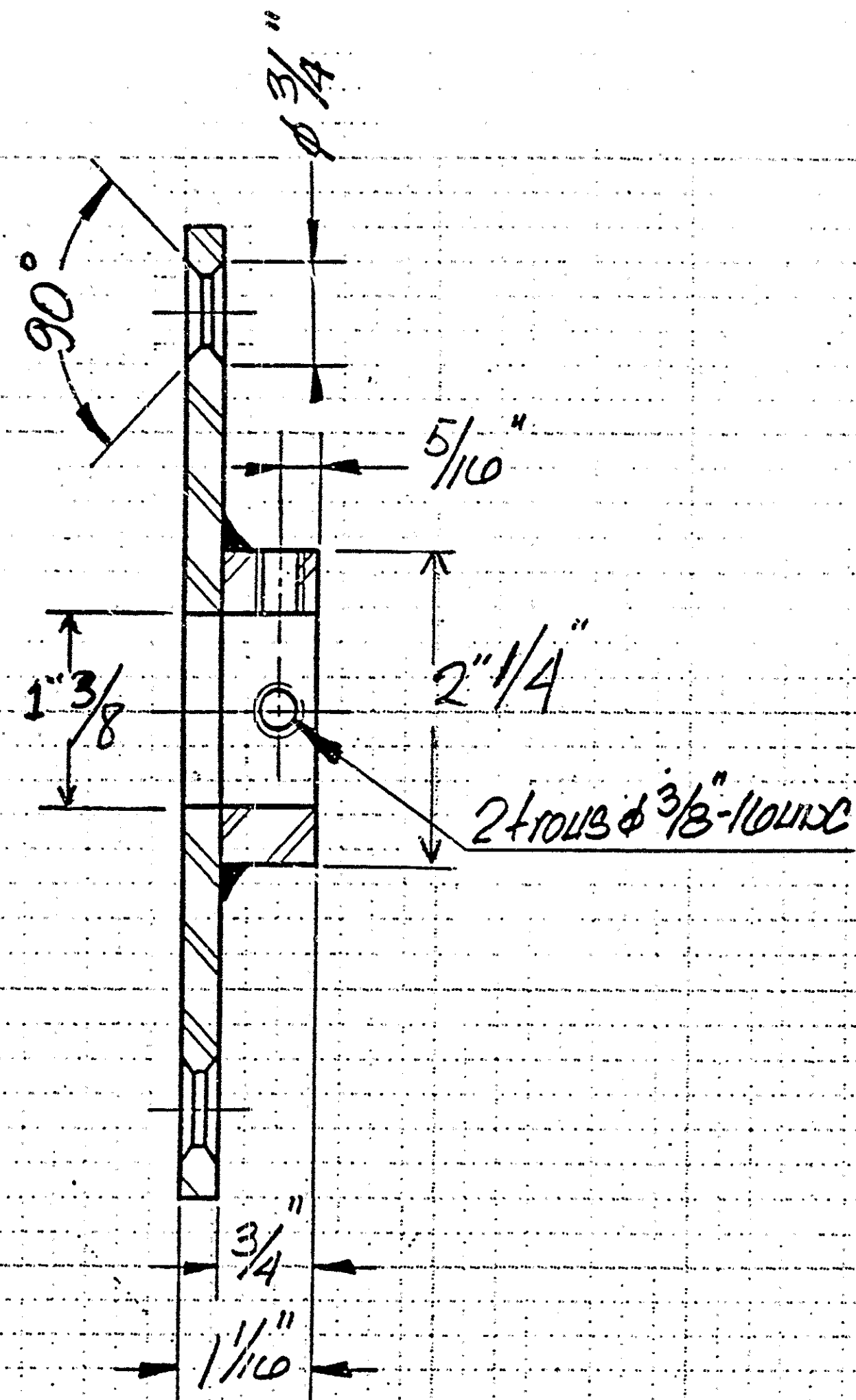
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RU-C- 23 - 161.24

Date **90-10-02** Feuille **24/**

Echelle _____ Scale **/52** Sheet

No. de référence _____ Reference no. _____



MATERIEL
ACIER LAMINE A
CHAUD 1045



Environnement Canada / Environment Canada
Service Canadien des Parcs / Canadian Parks Service

Modifications	
A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par / Drawn by

Conçu par / Design by

Vérifié par / Checked by
Azarie Lavigne
Yvon Laframboise

Approuvé par / Approved by

Chargé du projet / Job Captain
Azarie Lavigne

Chef de section / Section head
Jean-Claude Langlois

Gérant de secteur / Area manager
Pierre Parent

Projet / Project
CANAL CHAMBLY
ECLUSE No.1-2-3
MECANISME DE VANNES

Titre du dessin / Drawing Title

DISQUE DE BARRURE
DU MECANISME DE
VANNE RU-C-23-161.25

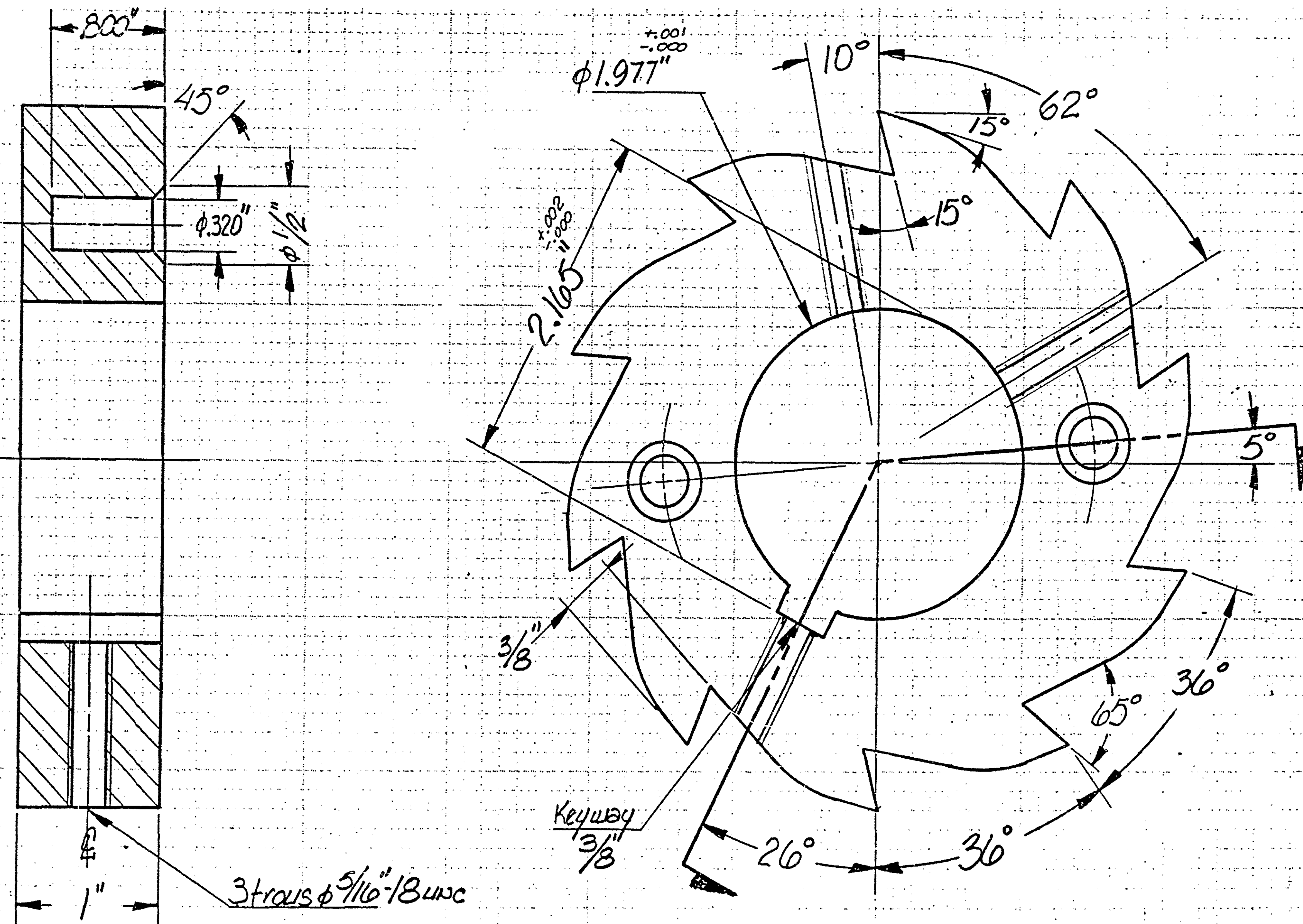
Date / Feuille
90-10-02 / 25

Echelle / Scale
/ 52

No. de référence / Reference no.



Environnement Canada
 Environment Canada
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MATERIEL
 ACIER LAMINE A
 CHAUD C-1020

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par **Azarie Lavigne** / **Yvon Laframboise** Checked by

Approuvé par _____ Approved by _____

Chargé du projet _____ Job Captain

Azarie Lavigne

Chef de section _____ Section head

Jean-Claude Langlois

Gérant de secteur _____ Area manager

Pierre Parent

Projet _____ Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

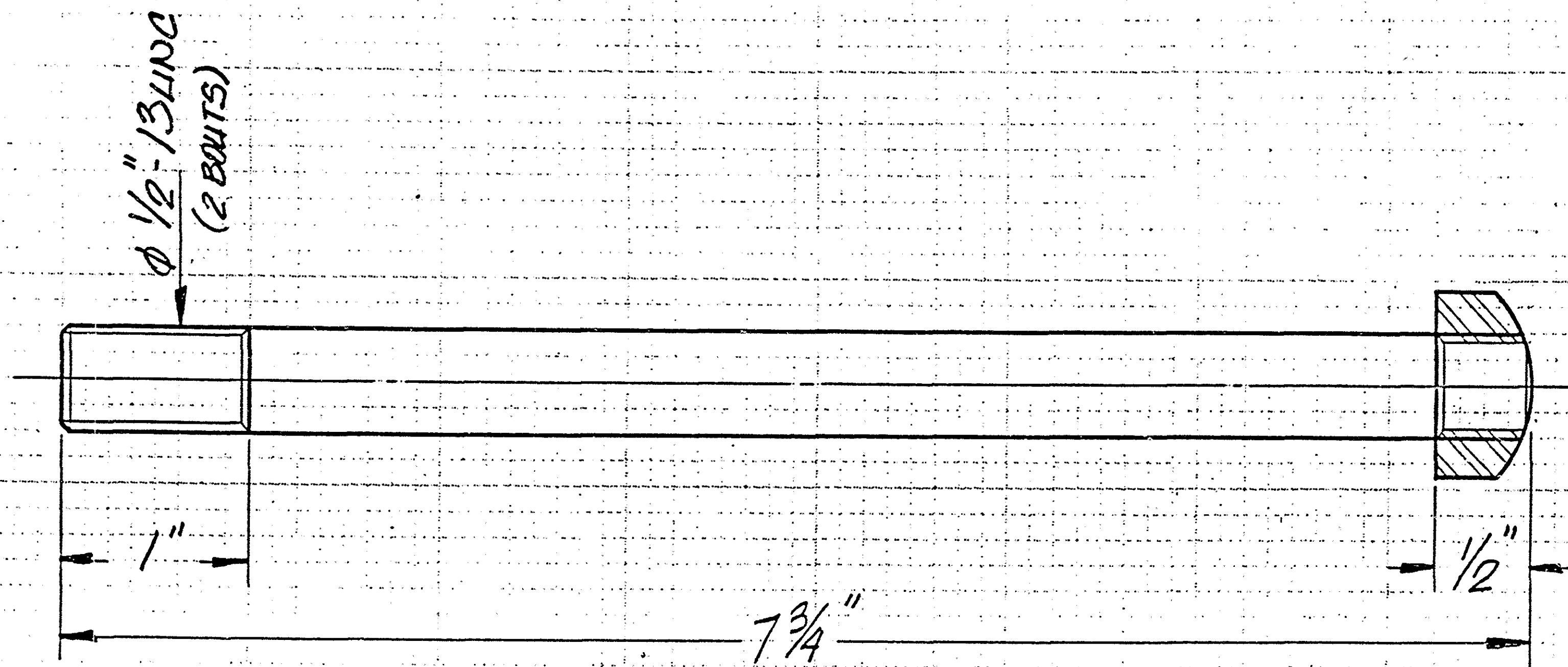
Titre du dessin _____ Drawing Title

**ROUE A ROCHET POUR
 MECANISME ANTI-RECUL
 RU-C-23-161.26**

Date 90-10-02	Feuille 26/
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Echelle	Scale	Sheet 52
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No. de référence	Reference no.
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MATERIEL
ACIER LAMINE A
CHAUD 1045

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par Drawn by

Conçu par Design by

Vérifié par Checked by
 Azarie Lavigne
 Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain

Azarie Lavigne

Chef de section Section head

Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

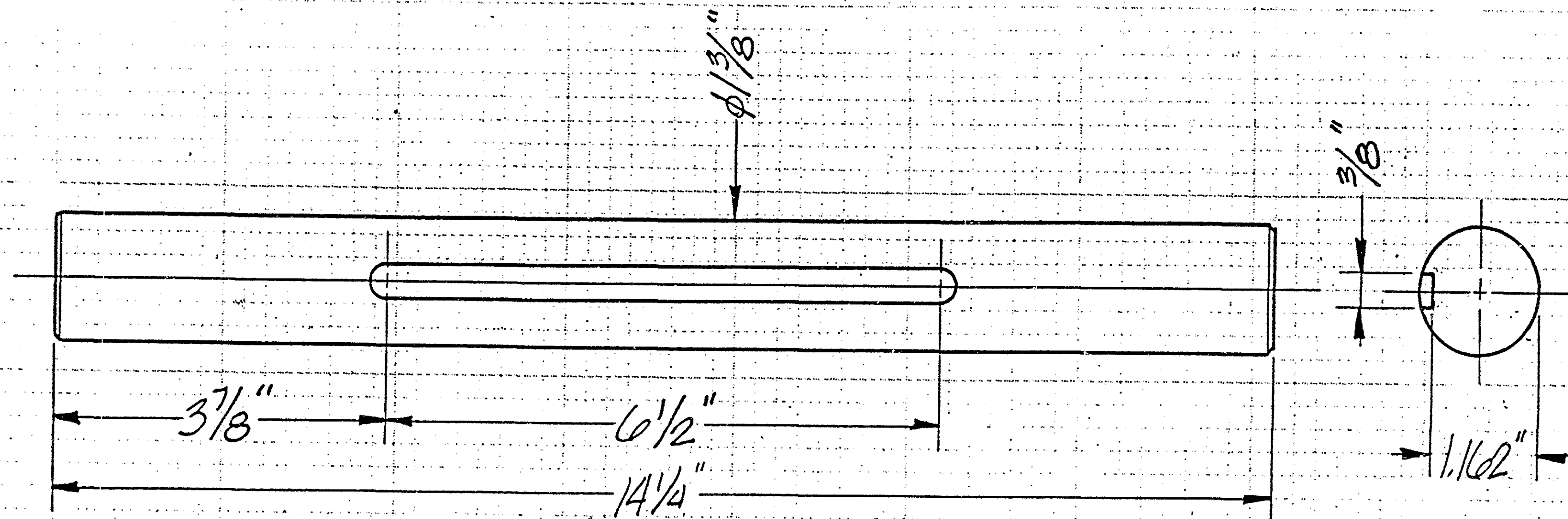
BOULON DU MECA-
NISME DU TENDEUR
RU-C-23-16L-27

Date 90-10-02

Echelle Scale

No. de référence Reference no.

Feuille
 27
 Sheet
 52



MATERIEL
 ACIER LAMINE A
 FROID 1020



Environnement Canada
 Service Canadien des Parcs

Environment Canada
 Canadian Parks Service

Modifications

A. No du détail	A	A. Detail no
B. Localisation	B/C	B. Localisation
C. Sur feuille no		C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par Azarie Lavigne
Yvon Laframboise Checked by

Approuvé par _____ Approved by _____

Chargé du projet _____ Job Captain

Azarie Lavigne

Chef de section _____ Section head

Jean-Claude Langlois

Gérant de secteur _____ Area manager

Pierre Parent

Projet _____ Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin _____ Drawing Title

ARBRE DE COUCHE

RU-C-23-161-28

Date 90-10-02

Echelle _____ Scale 28/152
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No. de référence _____ Reference no.

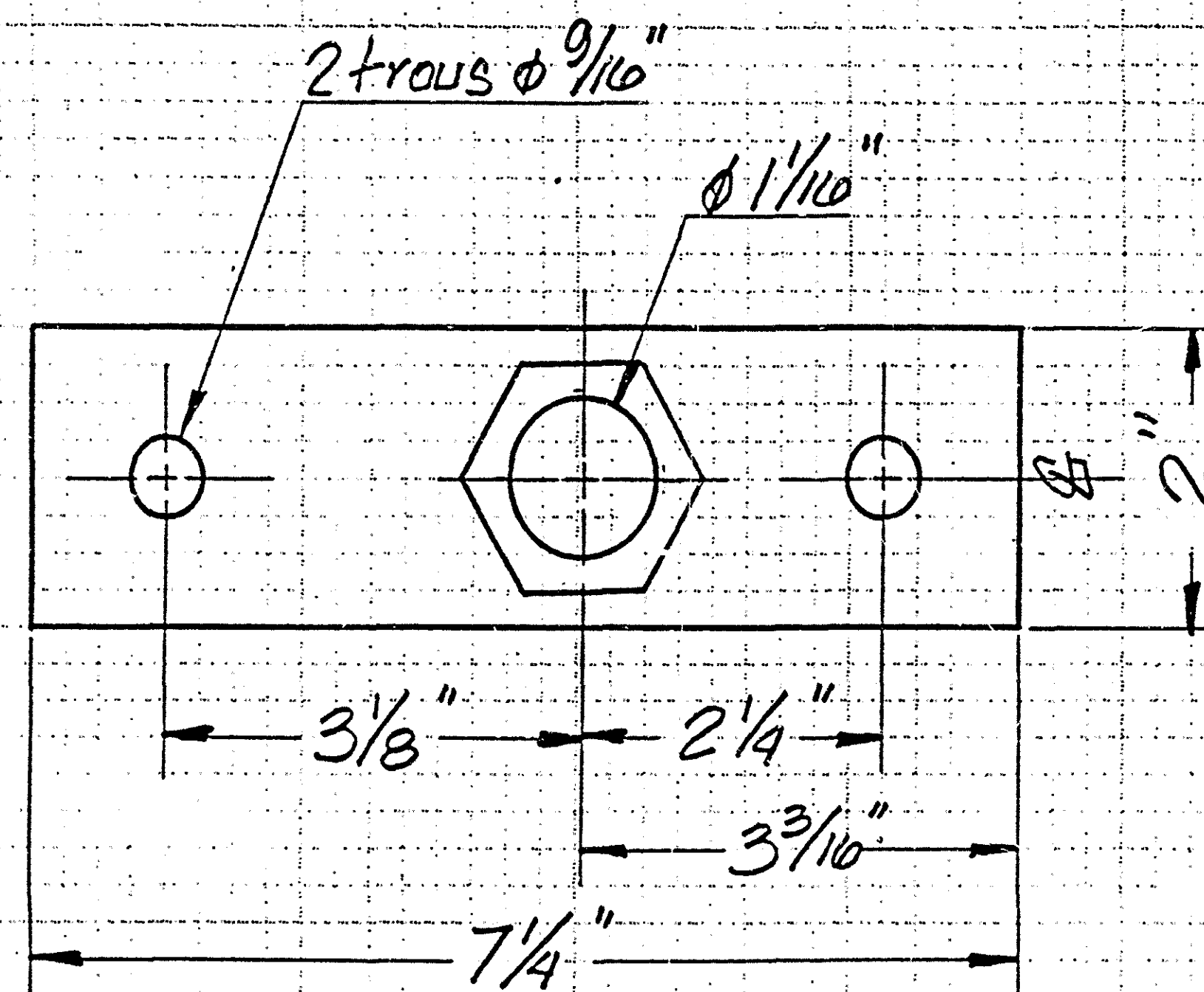


Environnement
Canada

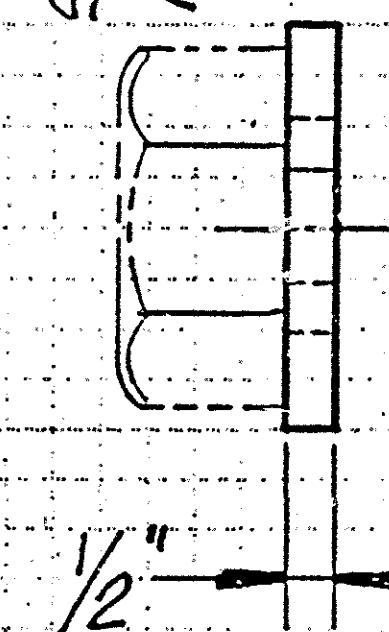
Environment
Canada

Servive Canadian
des Parcs

Canadian Parks
Service



SOLDER BOULON
1" BUNE APRES
PERÇAGE



MATERIEL
ACIER LAMINE A
CHAUD 1045

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par Drawn by

Conçu par Design by

Vérifié par Checked by
Azarie Lavigne
Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain

Azarie Lavigne

Chef de section Section head

Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

PIECE DU TENDEUR
DE LA CREMAILLIERE
RU-C-23-161.29

Date
90-10-02

Feuille
29/

Echelle
Scale

1/52
Sheet

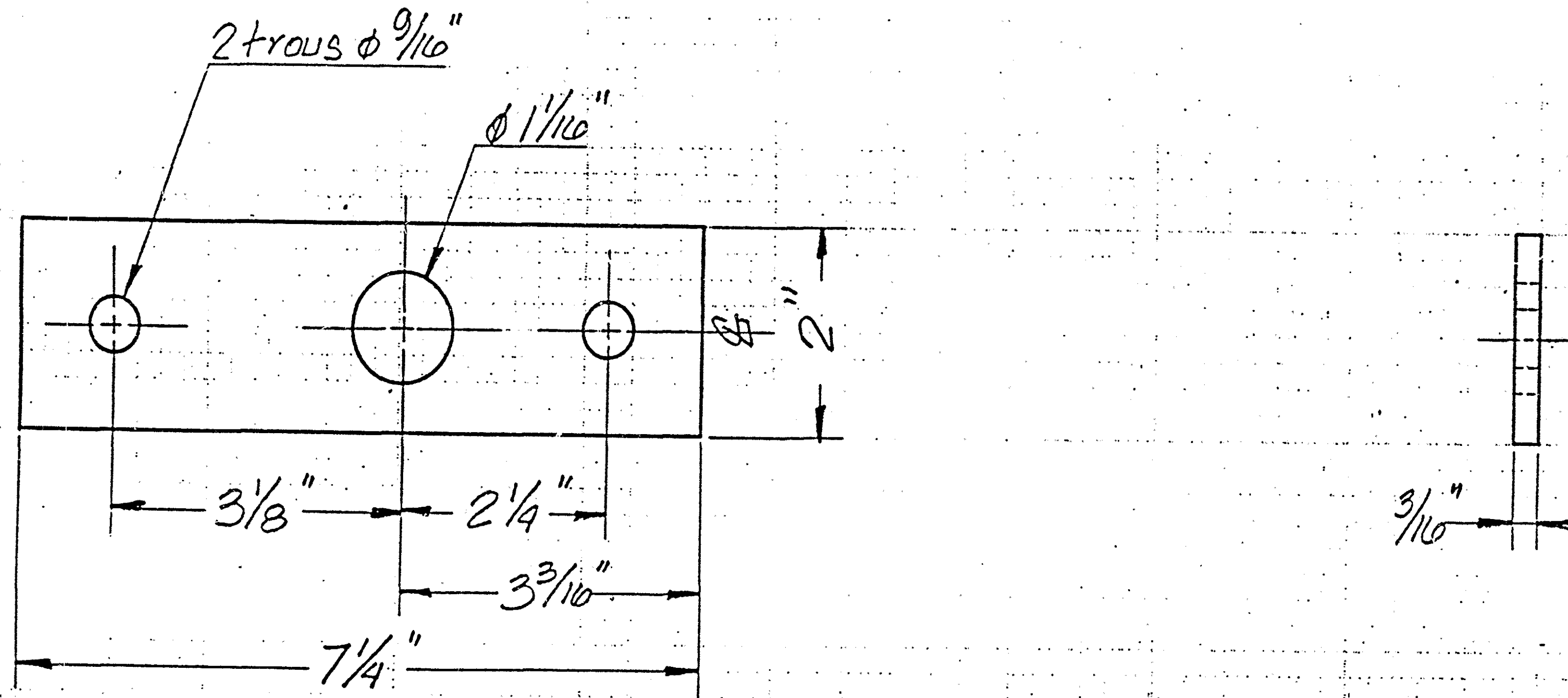
No. de référence

Reference no.



Environnement Canada
 Service Canadien des Parcs

Environment Canada
 Canadian Parks Service



MATERIEL
 ACIER LAMINE A
 CHAUD 1045

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par Azarie Lavigne / Yvon Lafrancoise Checked by

Approuvé par _____ Approved by _____

Chargé du projet _____ Job Captain

Azarie Lavigne

Chef de section _____ Section head

Jean-Claude Langlois

Gérant de secteur _____ Area manager

Pierre Parent

Projet _____ Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

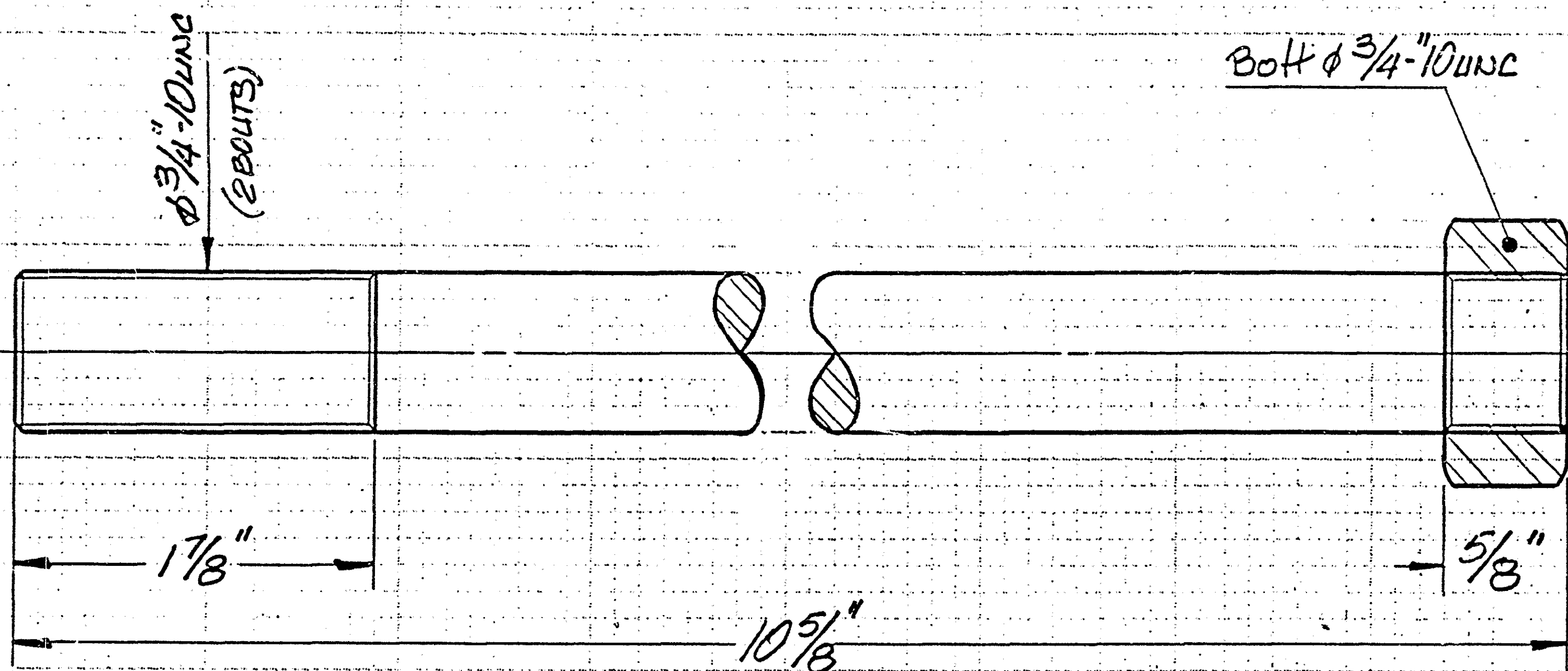
Titre du dessin _____ Drawing Title

**PIECE DU TENDEUR
 DE LA CREMAILLIERE
 RU-C-23-16.30**


Date 90-10-02 Feuille 30/

Echelle _____ Scale 1/52
 Sheet

No. de référence _____ Reference no.



MATERIEL
 ACIER LAMINE A
 CHAUD 1045



 Environnement Canada
 Environment Canada
 Service Canadien des Parcs
 Canadian Parks Service

Modifications
 A. No du détail A. Detail no
 B. Localisation B. Localisation
 C. Sur feuille no C. On sheet no

Dessiné par Drawn by

Conçu par Design by

Vérifié par Checked by
 Azarie Lavigne
 Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain
 Azarie Lavigne

Chef de section Section head
 Jean-Claude Langlois

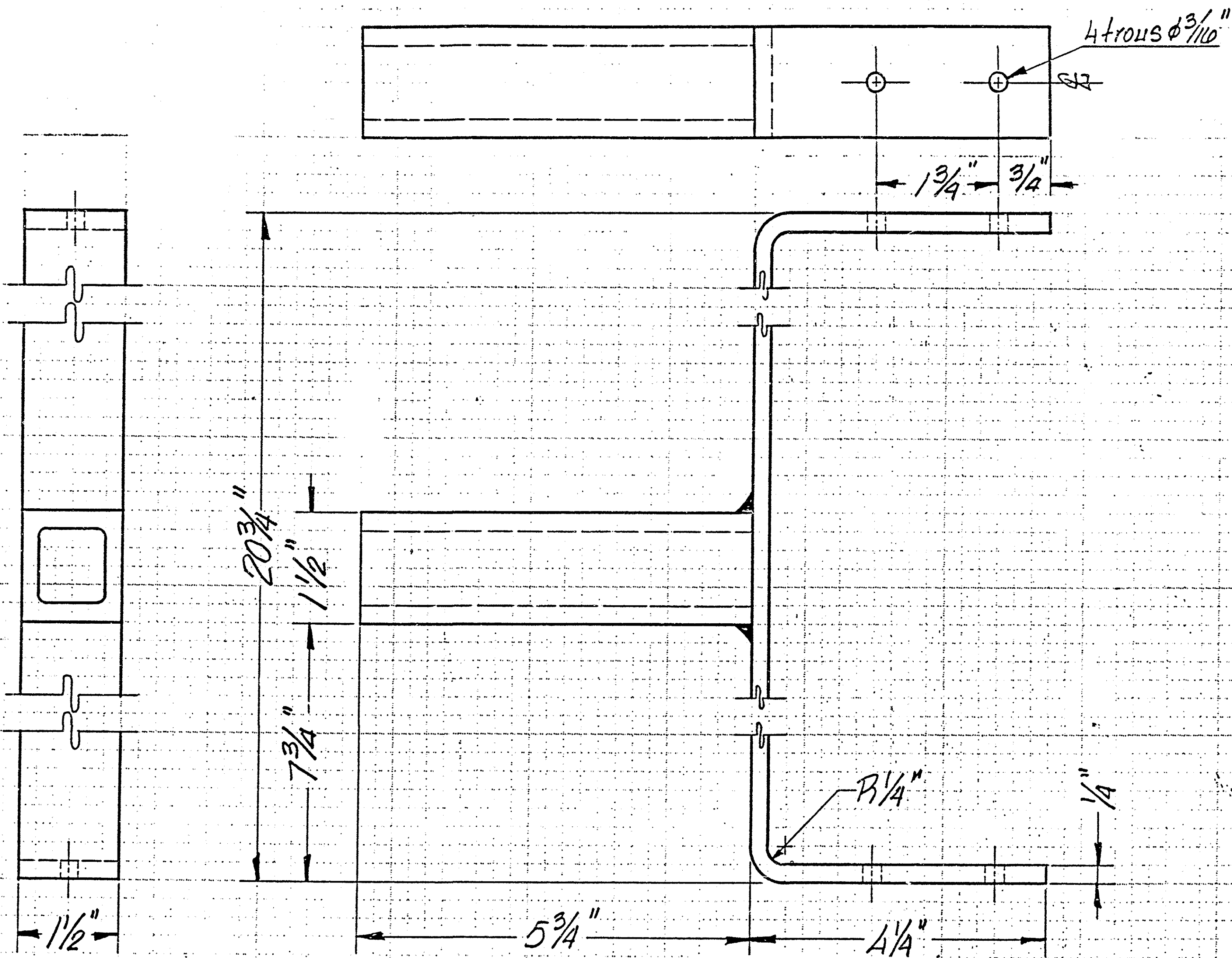
Gérant de secteur Area manager
 Pierre Parent

Projet Project
 CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES


Titre du dessin Drawing Title
 BOULON DES COTES
 DE VANNE
 RU-C-23-161.31

Date 90-10-02 Feuille 31/
 Echelle Scale 1/52
 Sheet

No. de référence Reference no.



Cette Pièce ne fait pas parti intégrante du mécanisme de vanne.



 Environnement Canada / Environment Canada

 Service Canadien des Parcs / Canadian Parks Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par / Drawn by

Conçu par / Design by

Véifié par / Checked by
 Azarie Lavigne
 Yvon Laframboise

Approuvé par / Approved by

Chargé du projet / Job Captain
 Azarie Lavigne

Chef de section / Section head
 Jean-Claude Langlois

Gérant de secteur / Area manager
 Pierre Parent

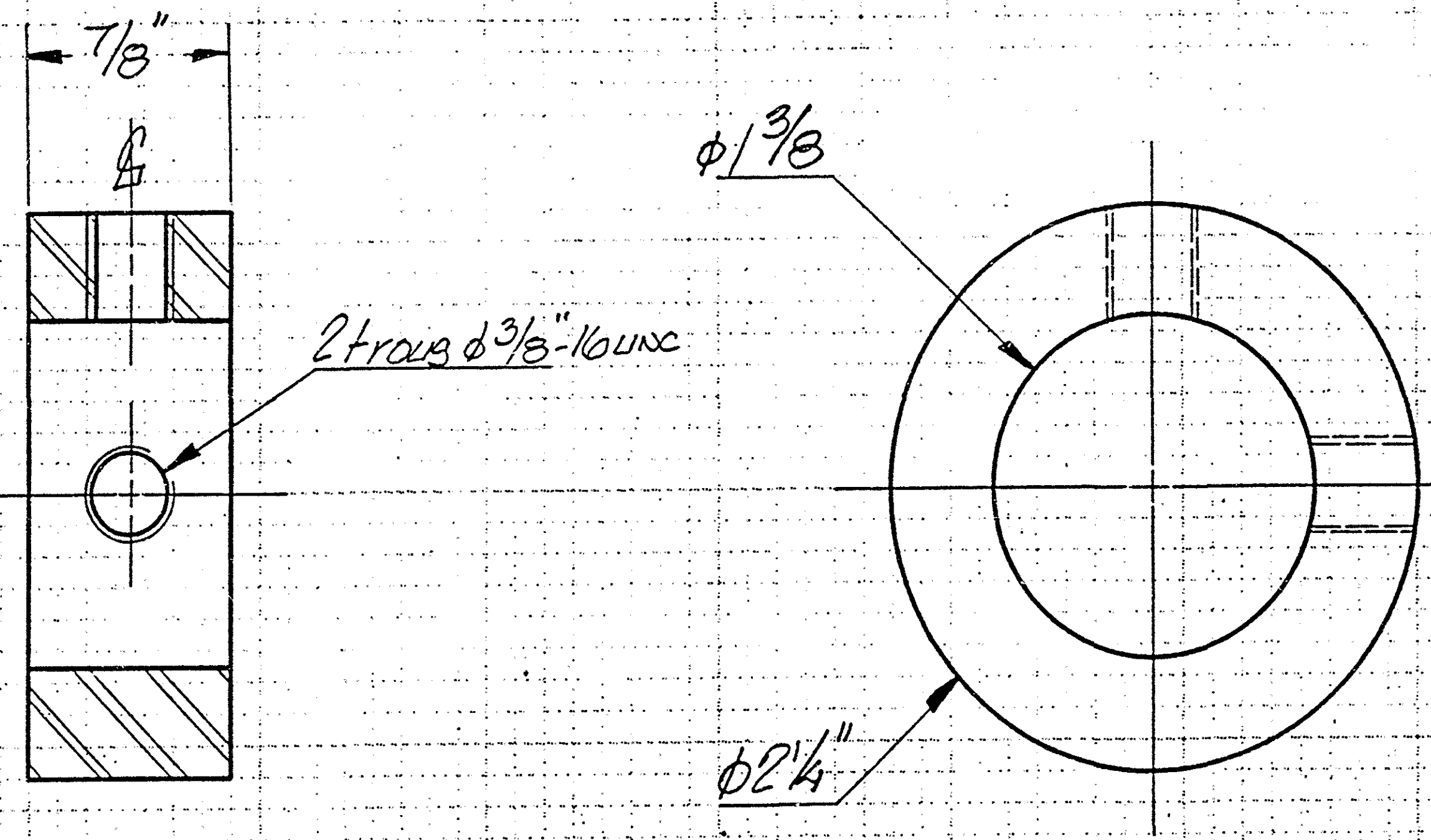
Projet / Project
 CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

Titre du dessin / Drawing Title

SUPPORT DE LA
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 TRANSPORT
 RU-C-23-161.32

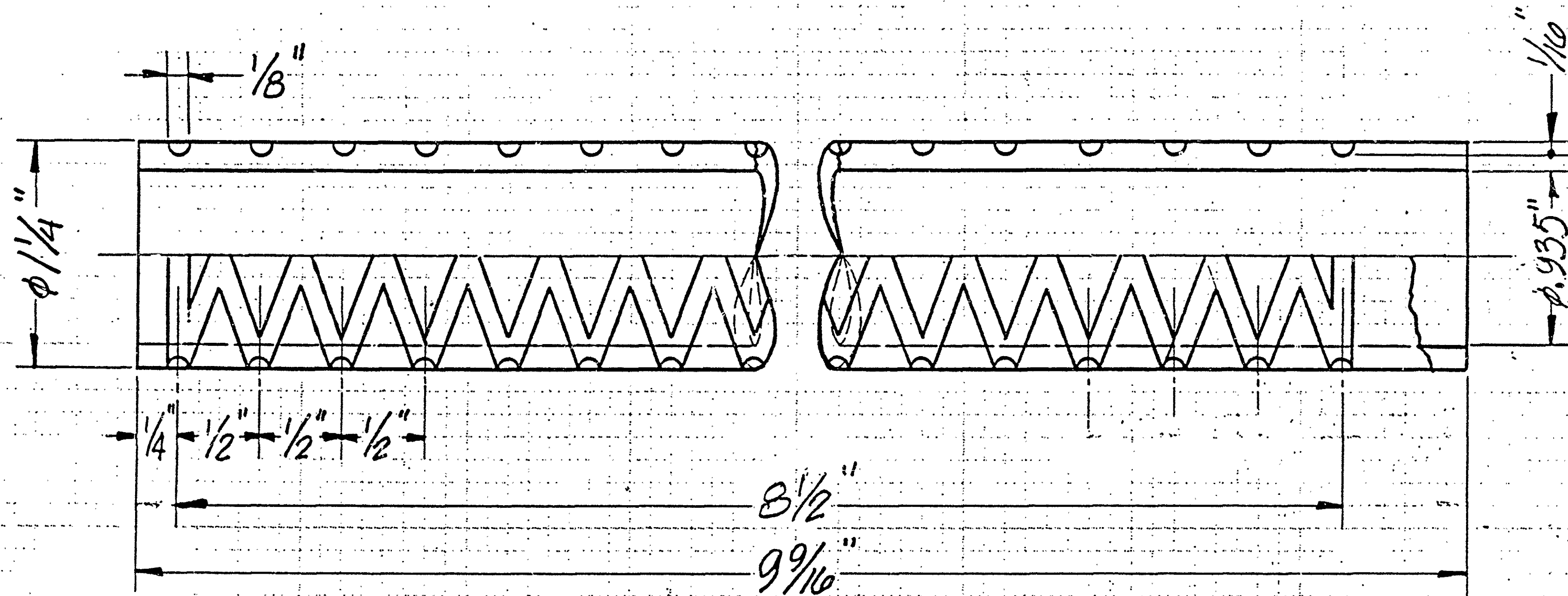
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Echelle		Scale	52
		Sheet	

No. de référence / Reference no.



MATERIEL
ACIER LAMINE A
CHAUD 1045

Modifications	
A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no
Dessiné par	Drawn by
Conçu par	Design by
Vérifié par Azarie Lavigne Yvon Laframboise	Checked by
Approuvé par	Approved by
Chargé du projet	Job Captain
Azarie Lavigne	
Chef de section	Section head
Jean-Claude Langlois	
Gérant de secteur	Area manager
Pierre Parent	
Projet	Project
CANAL CHAMBLY	
ECLUSE No.1-2-3	
MECANISME DE VANNES	
Titre du dessin	Drawing Title
BUTOIR D'ARBRE	
DE COUCHE DE	
VANNE RU-C-23-16.33	
32	
Date	Feuille
90-10-02	33
Echelle	Scale
	1/52
No. de référence	Reference no.



MATERIEL
 NYLON JAYTREL
 POLYESTER 66SA

I+I

Environnement Canada
 Environment Canada
 Service Canadien des Parcs
 Canadian Parks Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

A
B/C

Dessiné par Drawn by

Conçu par Design by

Véifié par Checked by
 Azarie Lavigne
 Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain

Azarie Lavigne

Chef de section Section head

Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

POIGNEE DE MANI-
 VELLE
 RU-C-23-161.34

Date 90-10-02

Feuille 34

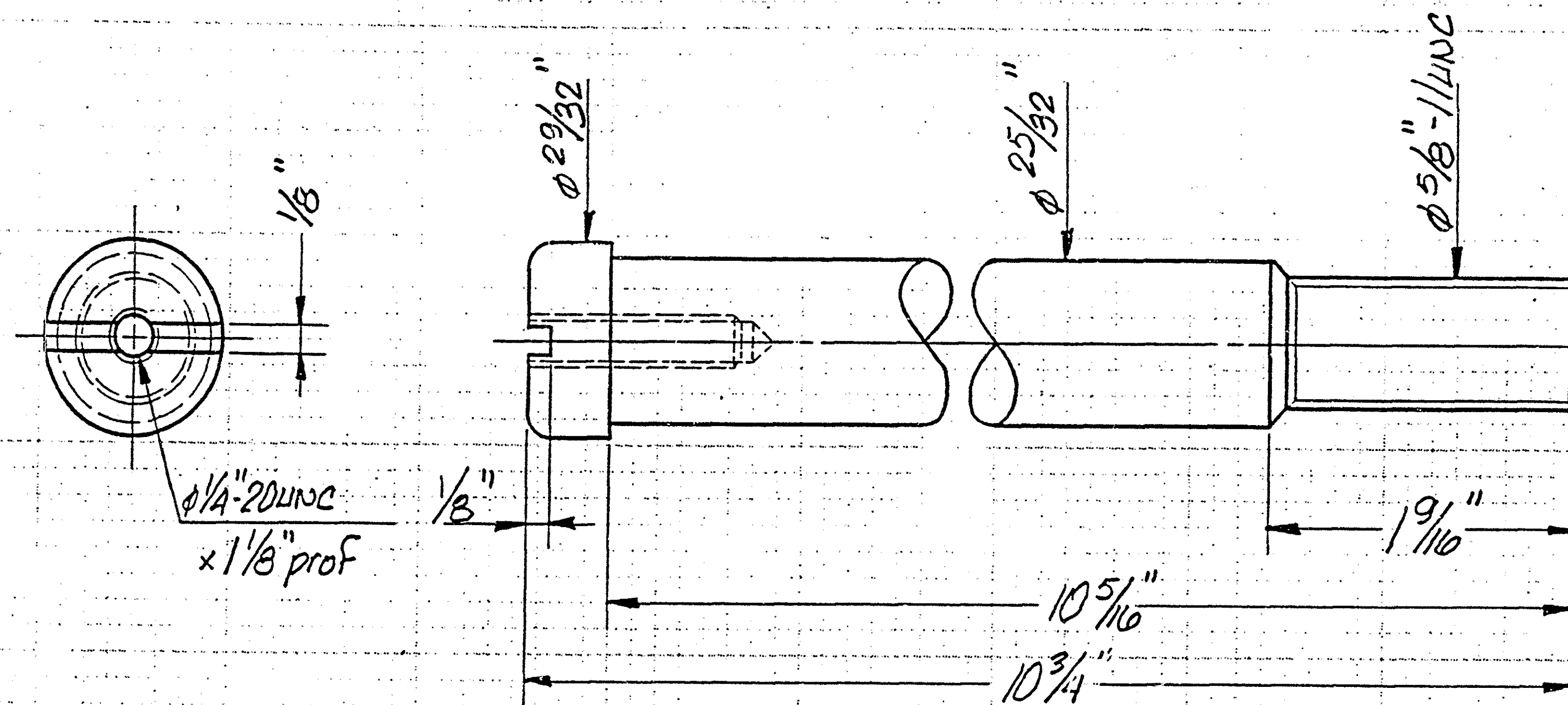
Echelle Scale 1/52

Sheet

No. de référence Reference no.



Environnement Canada
 Environment Canada
 Service Canadien des Parcs
 Canadian Parks Service



MATERIEL
 ACIER LAMINE A
 CHAUD C-1020

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par Azarie Lavigne
Yvon Laframboise Checked by _____

Approuvé par _____ Approved by _____

Chargé du projet Azarie Lavigne Job Captain

Chef de section Jean-Claude Langlois Section head

Gérant de secteur Pierre Parent Area manager

Projet CANAL CHAMBLY
ECLUSE No.1-2-3
MECANISME DE VANNES

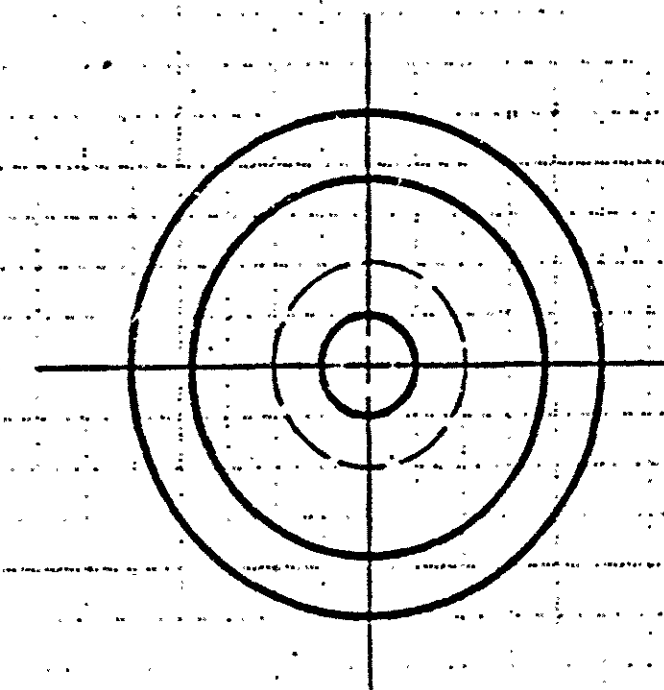
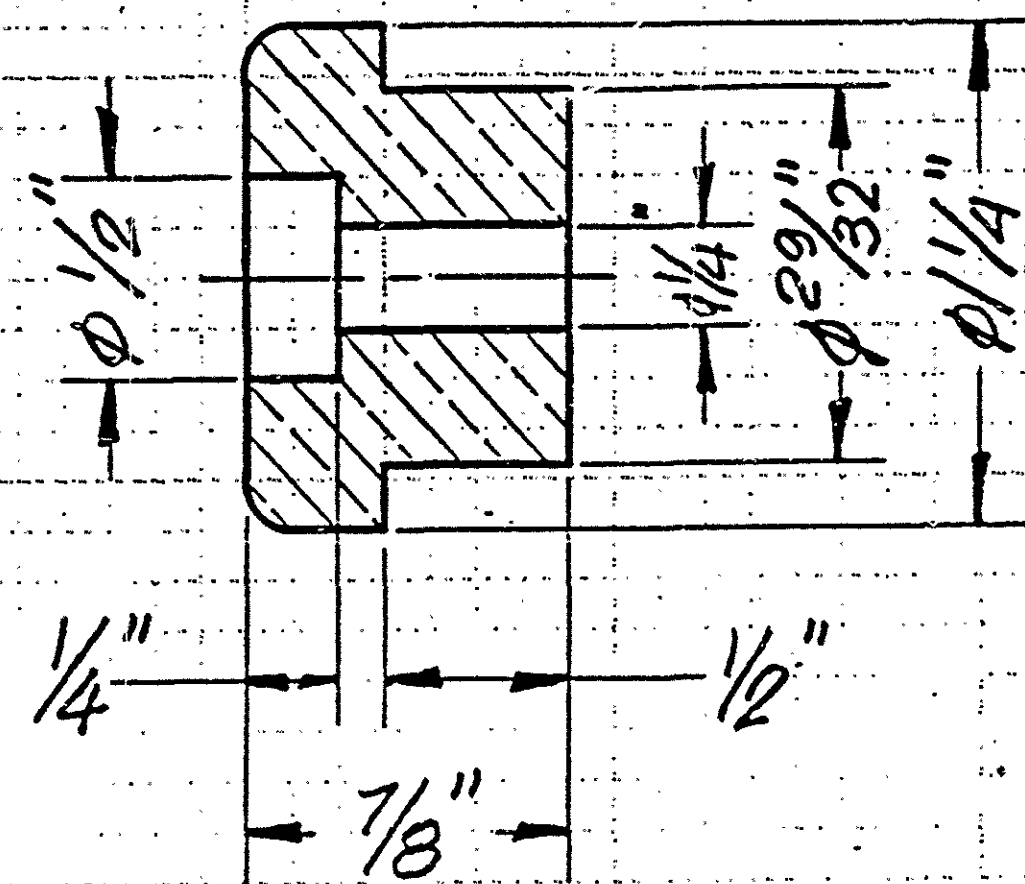
Titre du dessin _____ Drawing Title _____

ARBRE DE MANIVELLE
RU-C-23-161.35

Date 90-10-02 Feuille 35/

Echelle _____ Scale 1/52 Sheet

No. de référence _____ Reference no. _____



MATERIEL
 LAITON NAVAL
 60/40



Environnement
 Canada
 Service Canadien
 des Parcs

Environment
 Canada
 Canadian Parks
 Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



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Conçu par Design by

Vérifié par Checked by
 Azarie Lavigne
 Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain
 Azarie Lavigne

Chef de section Section head
 Jean-Claude Langlois

Gérant de secteur Area manager
 Pierre Parent

Projet Project
 CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

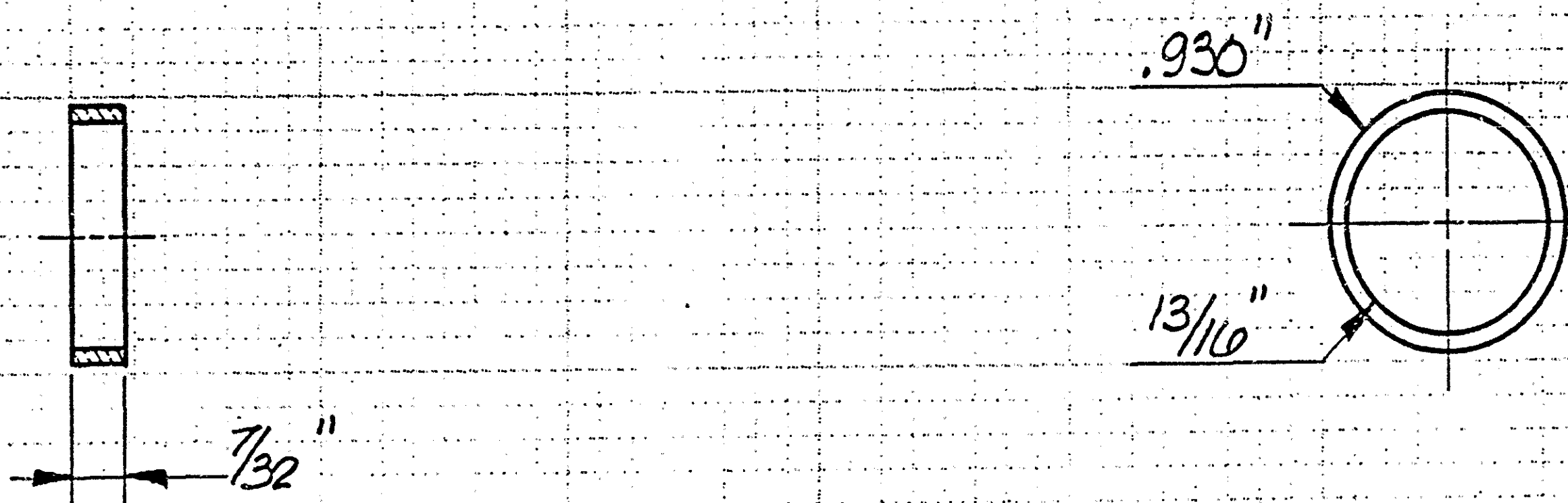
Titre du dessin Drawing Title

PIECE DE POIGNEE
 DE MANIVELLE
 RU-C-23-161.36


Date 90-10-02 Feuille 36

Echelle Scale 1/52 Sheet

No. de référence Reference no.



MATERIEL
 LAITON NAVAL
 60/40



 Environnement Canada / Environment Canada
 Service Canadien des Parcs / Canadian Parks Service

Modifications
 A. No du détail / A. Detail no
 B. Localisation / B. Localisation
 C. Sur feuille no / C. On sheet no

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 Yvon Lafrancoise

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Gérant de secteur / Area manager
 Pierre Parent

Projet / Project
 CANAL CHAMELY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

Titre du dessin / Drawing Title
 PIECE POIGNEE
 DE MANIVELLE
 RU-C-23-16137

Date / Feuille
 90-10-02 / 37

Echelle / Scale
 / 1/52 Sheet

No. de référence / Reference no.



Environnement
Canada

Environment
Canada

Service Canadien
des Parcs

Canadian Parks
Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

A
B/C

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Yvon Laframboise

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Chargé du projet Job Captain
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Jean-Claude Langlois

Gérant de secteur Area manager
Pierre Parent

Projet Project
CANAL CHAMELY

ÉCLUSE No.1-2-3

MECANISME DE VANNES

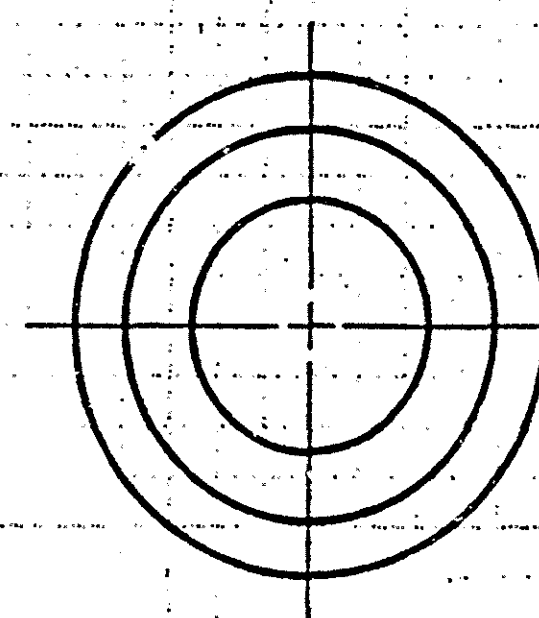
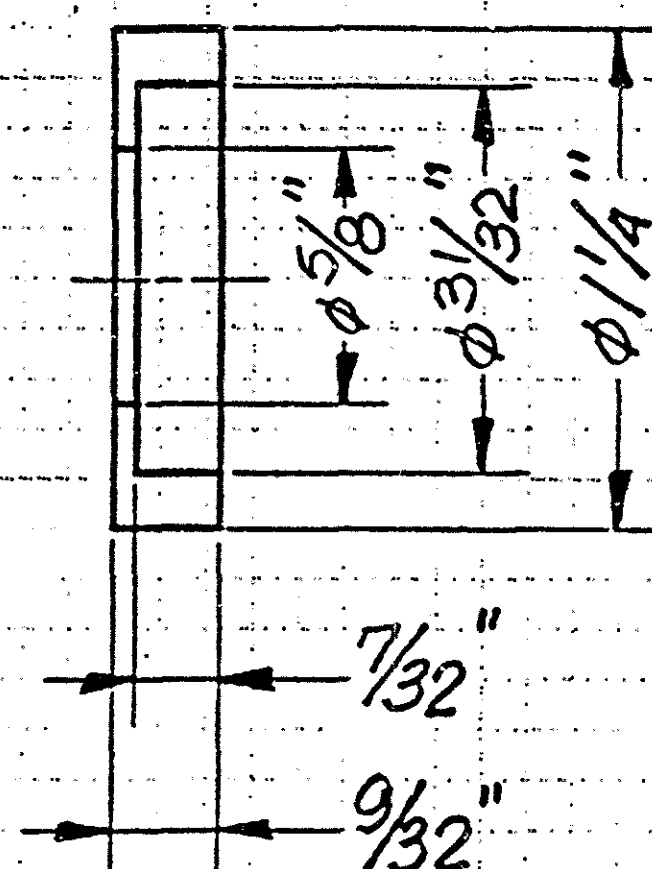
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PIECE POIGNEE
DE MANIVELLE
RU-C-23-161.38

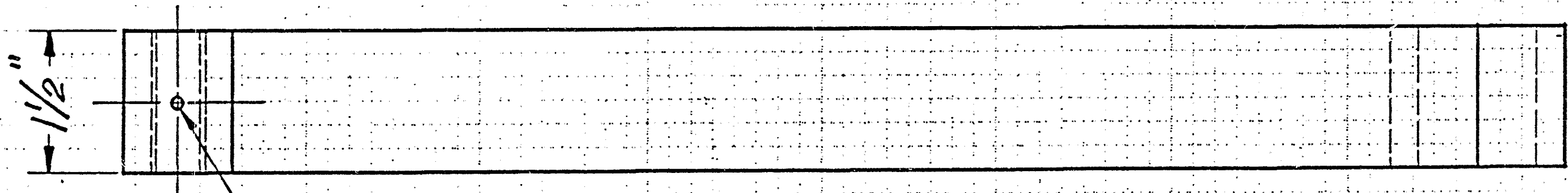
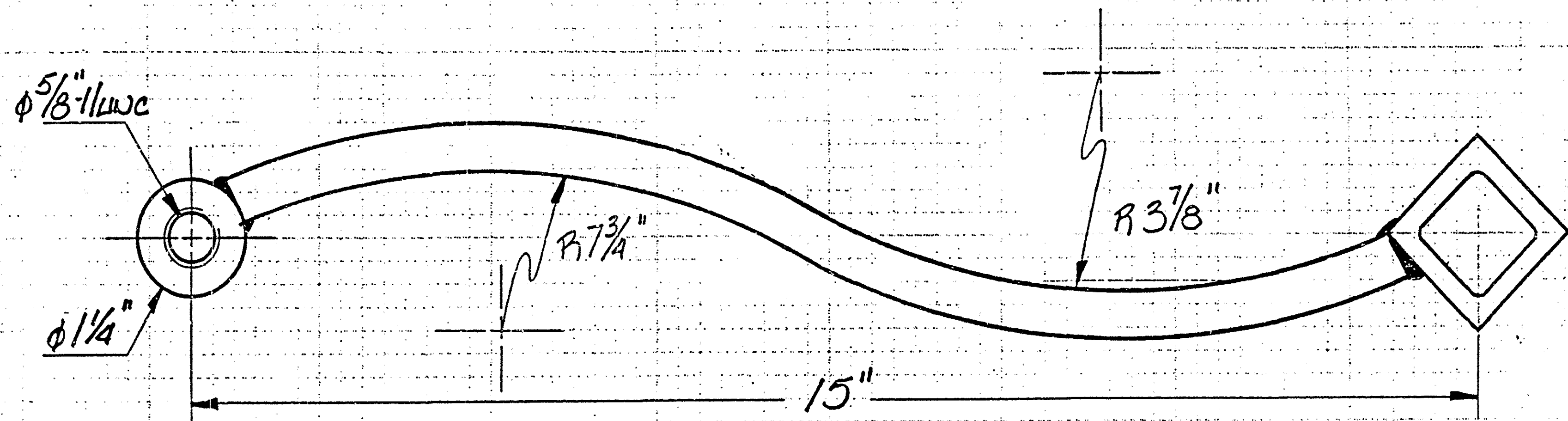
Date 90-10-02 Feuille 38

Echelle Scale 1/52 Sheet

No. de référence Reference no.



MATERIEL
NYLON JAYTREL
POLYSTER 66SA



*percer a l'assemblage avec arbre
de la poignée pour spring pin $\phi 1/8$ "*

MATERIEL
ACIER LAMINE A
CHAUD 1045

Environment Canada / Environnement Canada
Service Canadian des Parcs / Canadian Parks Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

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Azarie Lavigne

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Jean-Claude Lanolois

Gérant de secteur / Area manager

Pierre Parent

Projet / Project

CANAL CHAMBLY
ECLUSE No.1-2-3
MECANISME DE VANNES

Titre du dessin / Drawing Title

MANIVELLE DE
VANNE
RU-C-23-161.39

Date / Feuille
90-10-02 / 39/

Echelle / Scale
/ 52
Sheet

No. de référence / Reference no.

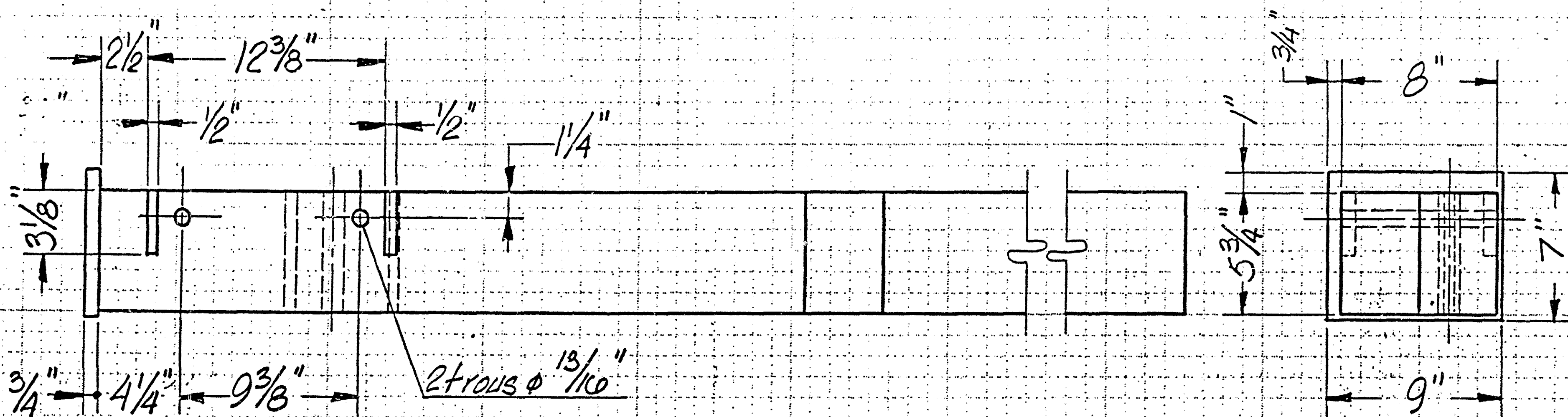
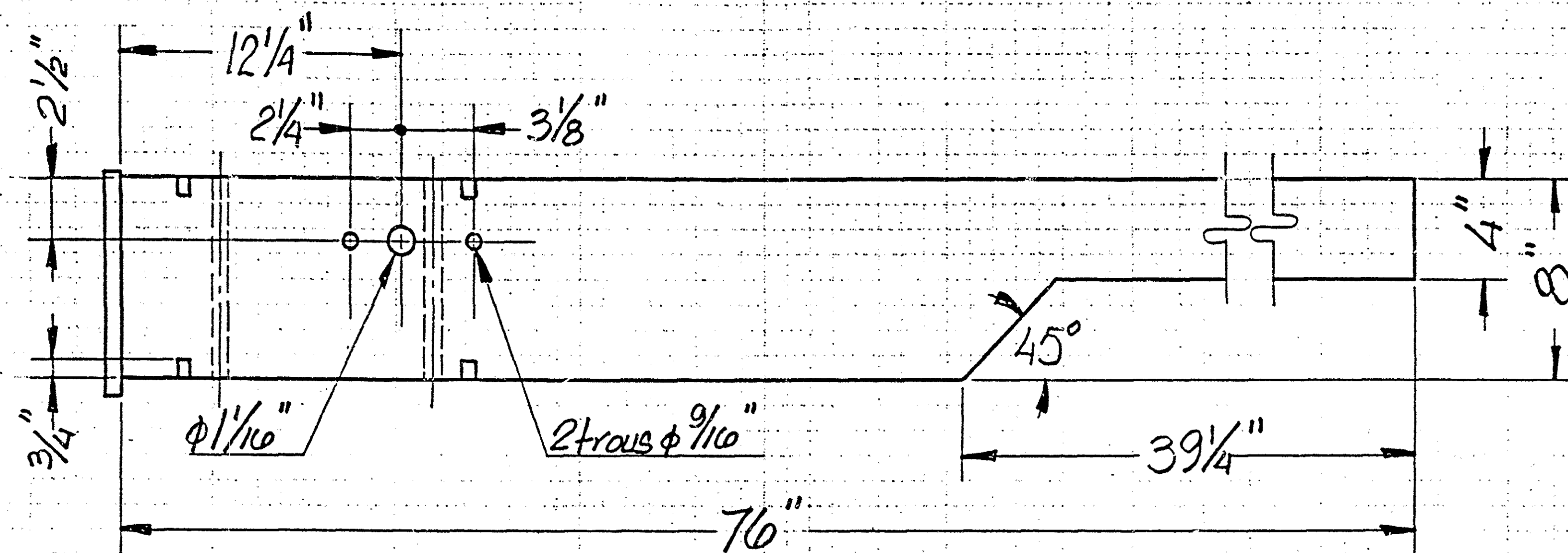


Environnement
Canada

Environment
Canada

Service Canadien
des Parcs

Canadian Parks
Service



MATERIEL
BOIS DE CHENE

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



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Gérant de secteur Area manager
Pierre Parent

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CANAL CHAMBLY
ECLUSE No.1-2-3
MECANISME DE VANNES

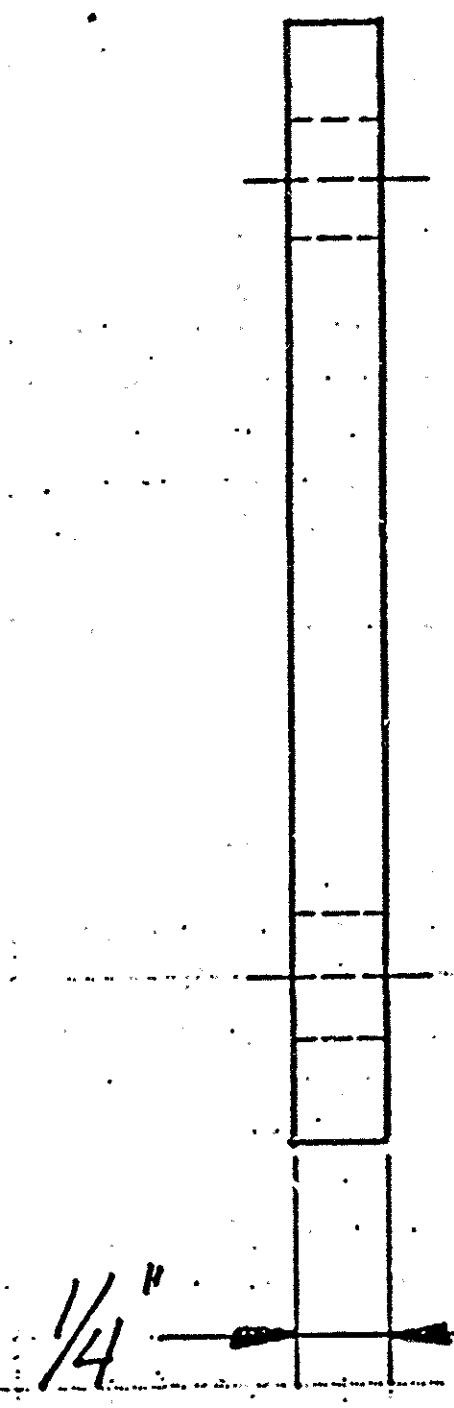
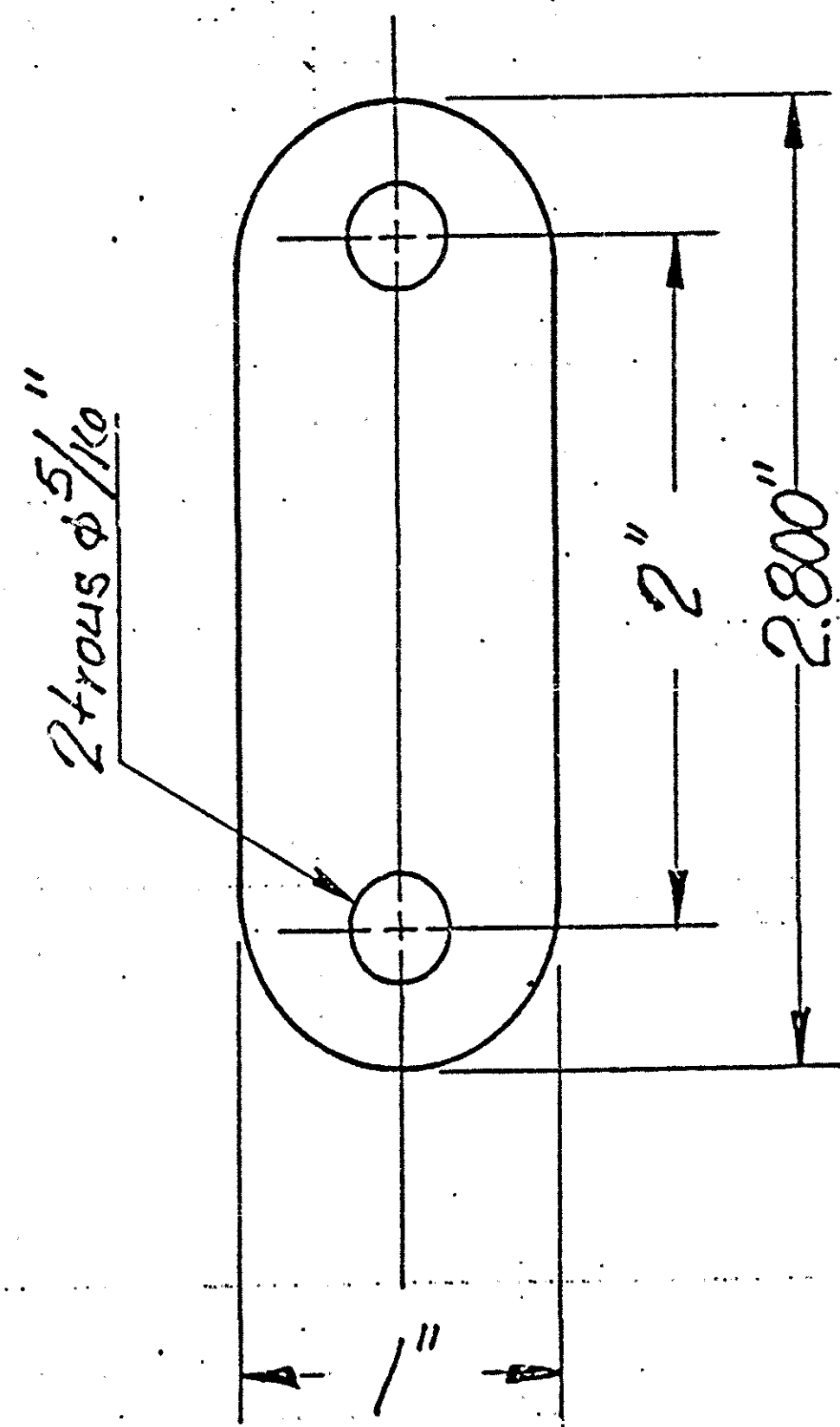
Titre du dessin Drawing Title

SUPPORT EN BOIS
DU MECANISME DE
VANNE
RU-c-23-161.90


Date 90-10-02

Echelle Scale 40/52
Sheet

No. de référence Reference no.




MATERIEL
 ACIFR LAMINE A
 CHAUD 1045



 Environnement Canada
 Service Canadien des Parcs
 Environment Canada
 Canadian Parks Service

Modifications

A. No du détail		A. Detail no
B. Localisation		B. Localisation
C. Sur feuille no		C. On sheet no

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Conçu par _____ Design by _____

Véifié par
 Azarie Lavigne
 Yvon Laframboise

Approuvé par _____ Approved by _____

Chargé du projet
 Azarie Lavigne

Chef de section
 Jean-Claude Langlois

Gérant de secteur
 Pierre Parent

Projet
 CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

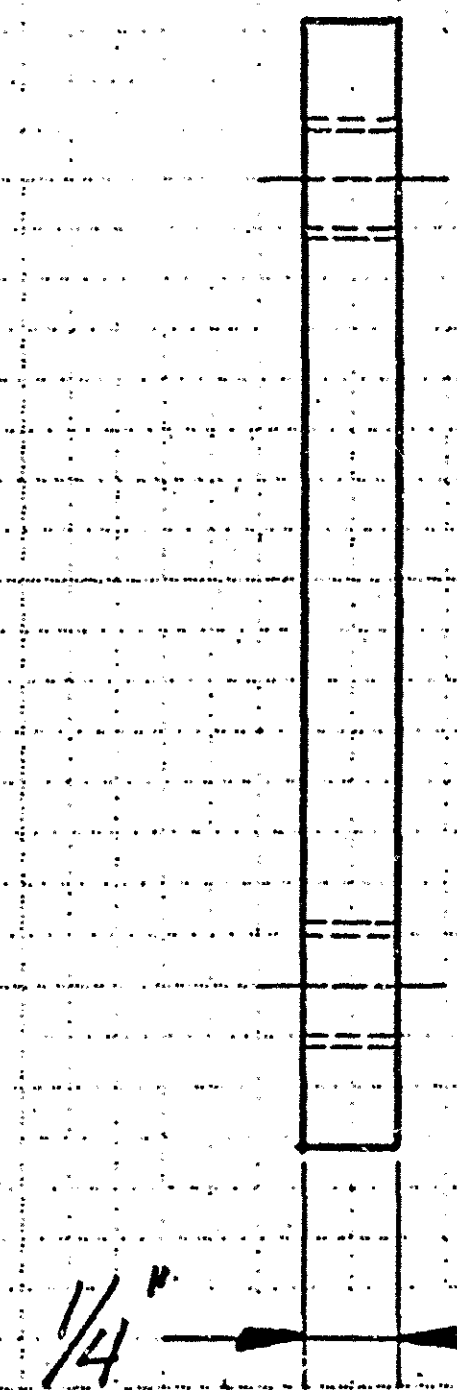
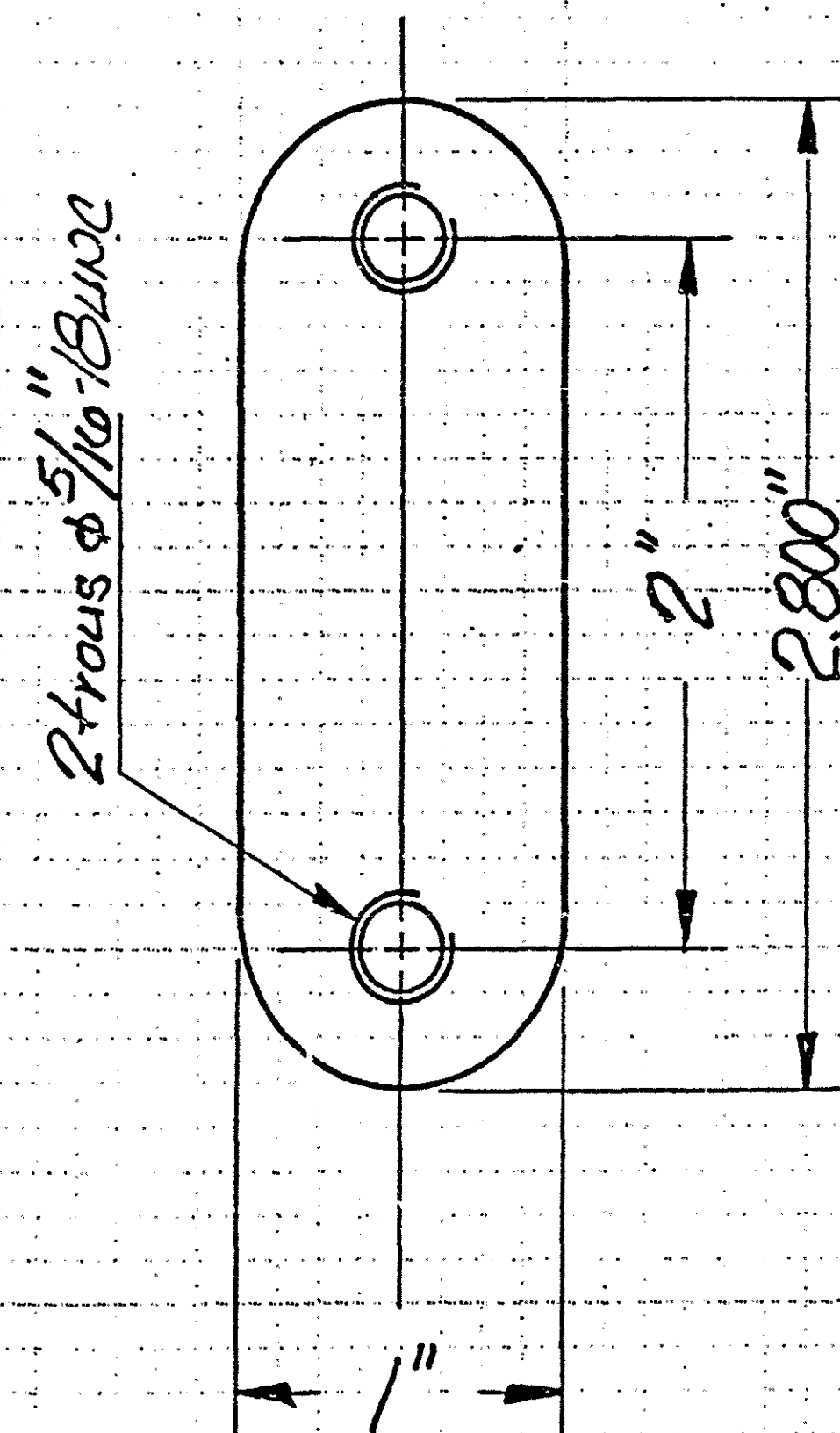
Titre du dessin Drawing Title

PIECE DU FREIN
 RU-C-23-161.41

Date 90-10-02 Feuille 41/

Echelle _____ Scale 1/52 Sheet

No. de référence _____ Reference no.



MATERIEL
ACIER LAMINE A
CHAUD 1045

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

A
B/C

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Pierre Parent

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ECLUSE No.1-2-3
MECANISME DE VANNES

Titre du dessin Drawing Title

PIECE DU FREIN
RU-C-23-161.42

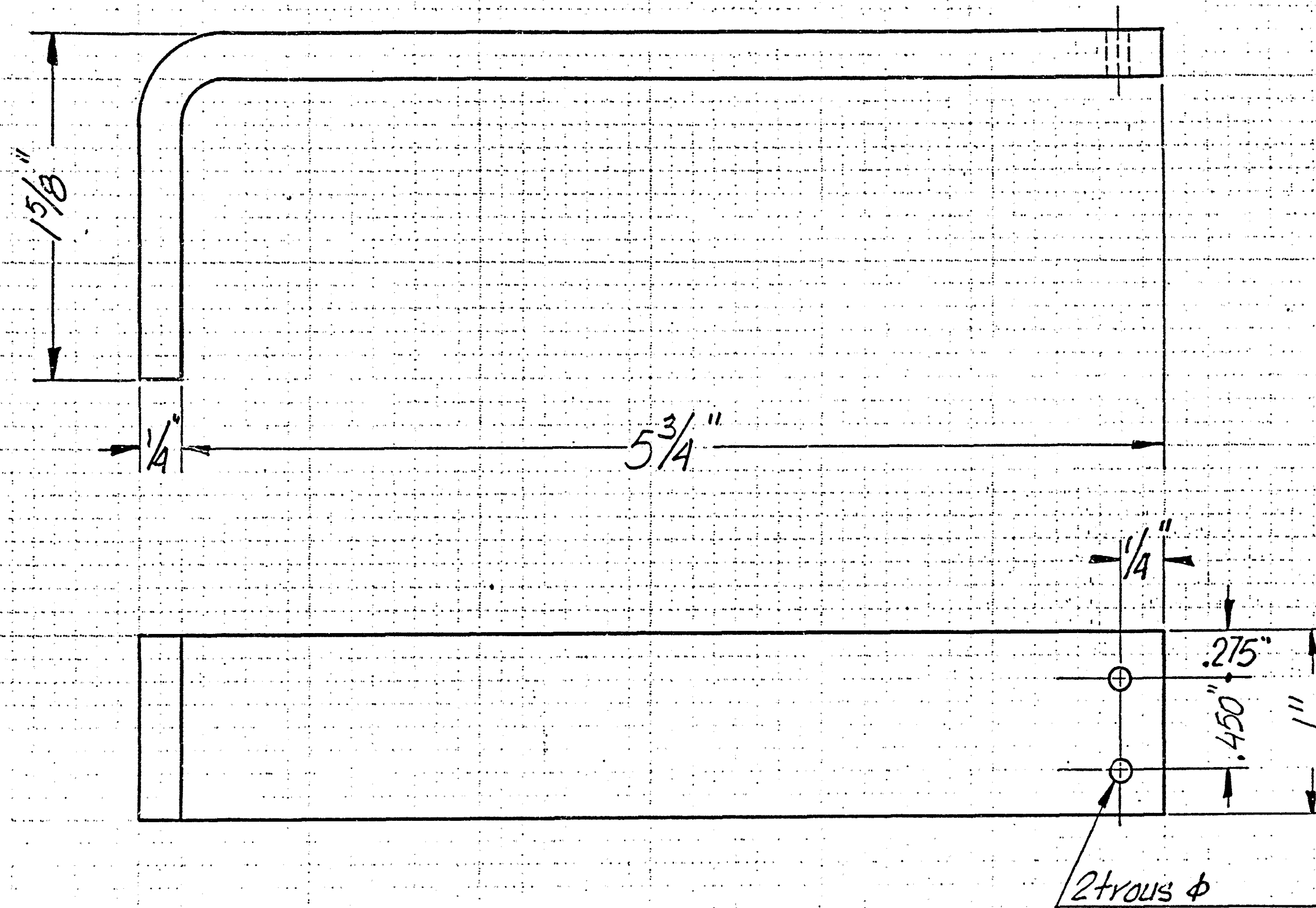
Date 90-10-02

Feuille 42/

Echelle Scale

Sheet 52

No. de référence Reference no.



MATERIEL
 ACIER LAMINE A
 CHAUD 1045



Environnement
 Canada
 Service Canadien
 des Parcs

Environment
 Canada
 Canadian Parks
 Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



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Conçu par Design by

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 Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain
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Chef de section Section head
 Jean-Claude Langlois

Gérant de secteur Area manager
 Pierre Parent

Projet Project
 CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

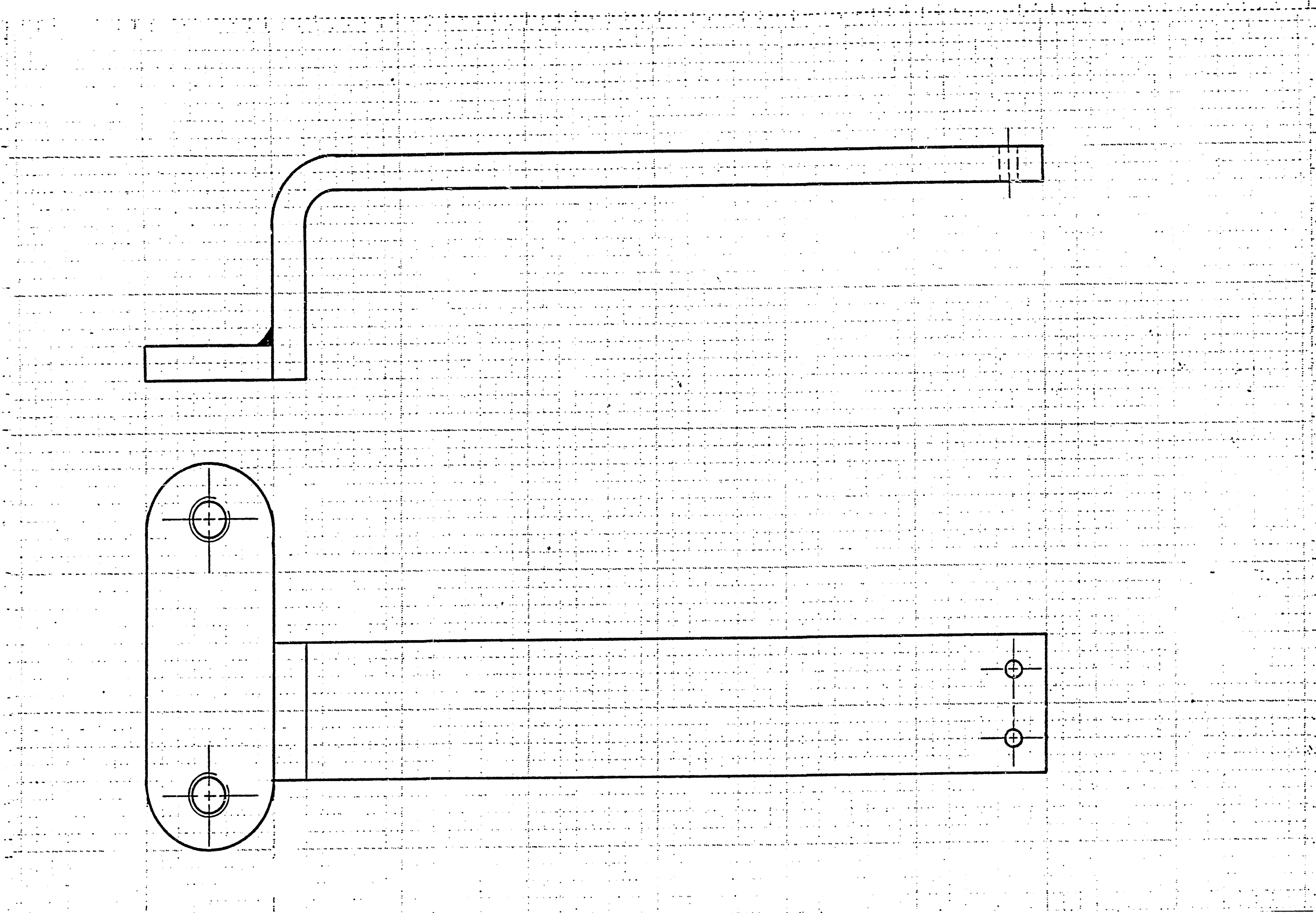
Titre du dessin Drawing Title

PIECE DU FREIN
 RU-C-23-161.43


Date 90-10-02 Feuille 43/

Echelle Scale 1/52 Sheet

No. de référence Reference no.



MATERIEL
 ACIER LAMINE A
 CHAUD 1045


 Environnement Canada
 Service Canadien des Parcs
 Environnement Canada
 Canadian Parks Service

Modifications

A. No du détail	A	A. Detail no
B. Localisation	B/C	B. Localisation
C. Sur feuille no		C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par _____ Checked by _____

Approuvé par _____ Approved by _____

Chargé du projet _____ Job Captain _____

Chef de section _____ Section head _____

Gérant de secteur _____ Area manager _____

Projet _____ Project _____

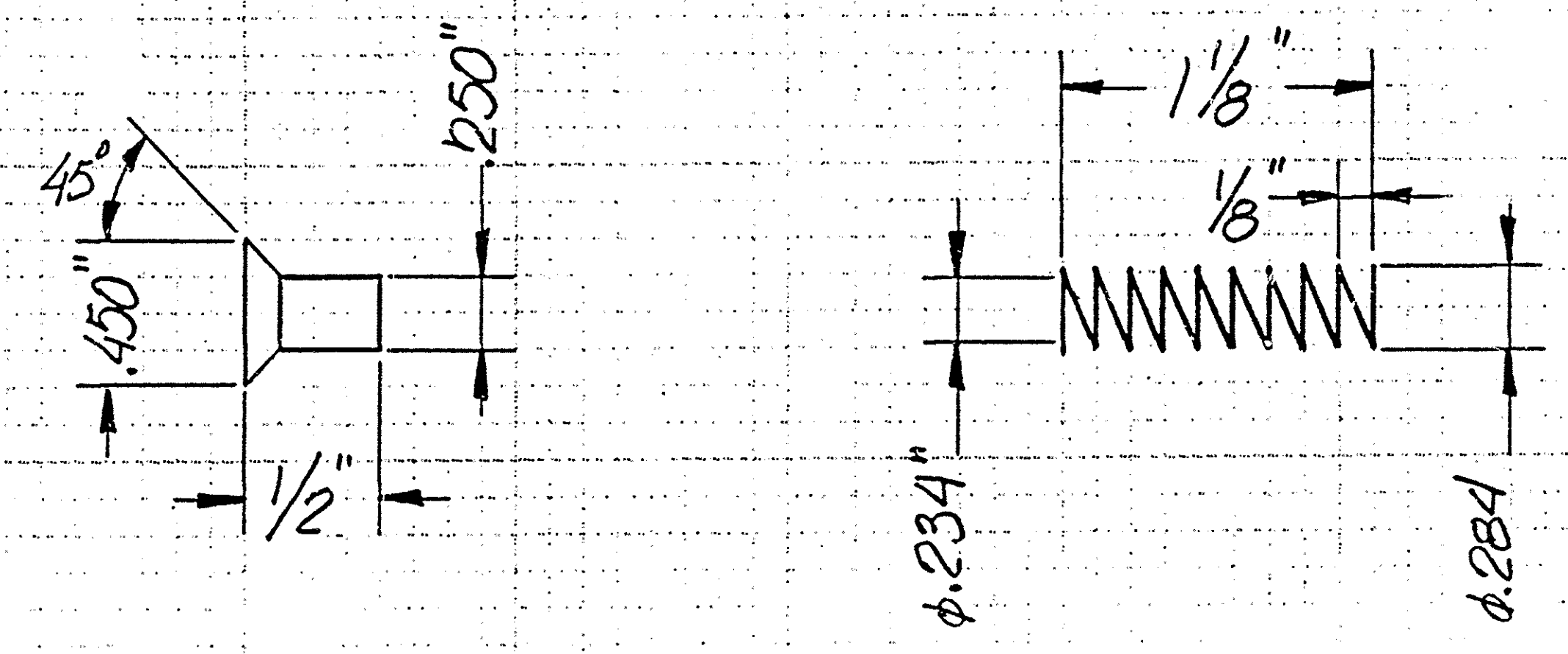
RU-C-161.44
 Titre du dessin _____ Drawing Title _____

SOUDURE DES DEUX
 PIECES RU-c-23-
 161.422 et du
 RU-c-23-161.43

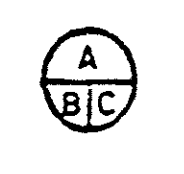
Date _____ Feuille _____

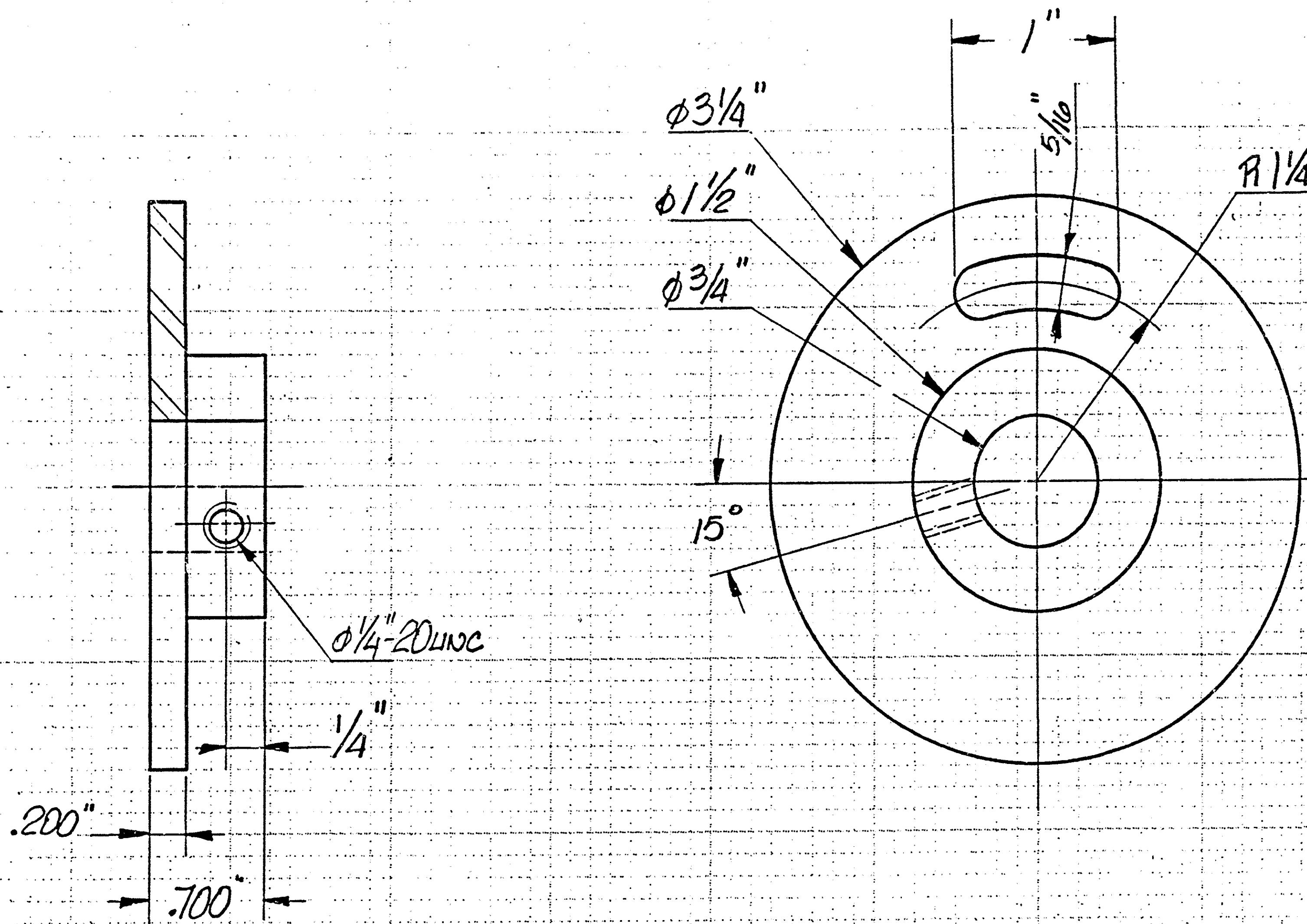
Echelle _____ Scale $\frac{44}{52}$
 Sheet

No. de référence _____ Reference no. _____



MATERIEL
 RIVETS DE COOPE
 ET RESSORT A COM-
 PRESSION (17)
 TOURS) 2 3/8"LONG
 9/32" DIAM.EXT.
 0.025 0.0450
 COMPRESSION

Modifications	
A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no
	
Dessiné par	Drawn by
Conçu par	Design by
Vérifié par Azarie Lavigne Yvor Laframpoise	Checked by
Approuvé par	Approved by
Chargé du projet Azarie Lavigne	Job Captain
Chef de section Jean-Claude Langlois	Section head
Gérant de secteur Pierre Parent	Area manager
Projet CANAL CHAMBLY ECLUSE No.1-2-3 MECANISME DE VANNES	Project
Titre du dessin / Drawing Title	
RIVET DE COOPE ET RESSORT MECA- NISME ANTI-RECULE RU-C-23-161.45	
Date 90-10-02	Feuille 45/52
Echelle	Scale Sheet
No. de référence	Reference no.



MATERIEL
ACIER LAMINE A
CHAUD C-1020



Environnement
Canada

Environment
Canada

Service Canadien
des Parcs

Canadian Parks
Service

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



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Conçu par Design by

Vérifié par
Azarie Lavigne
Yvon Laframboise

Checked by

Approuvé par Approved by

Chargé du projet Job Captain

Azarie Lavigne

Chef de section Section head

Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

ROUE DE BUTTER
DU MECANISME
ANTI-RECOLE
RU-C-23-161.46

Date
90-10-02

Feuille

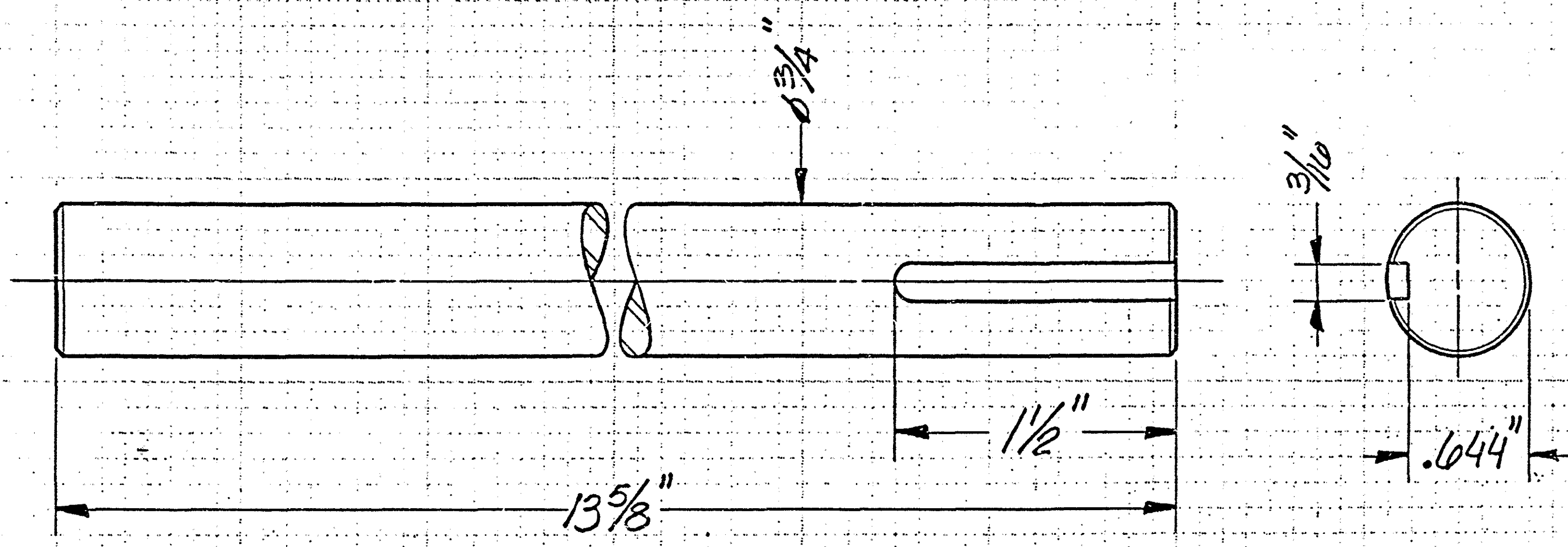
Echelle Scale

46/52

Sheet

No. de référence

Reference no.



MATERIEL
STAINLESS STEEL



Environnement Canada
Service Canadien des Parcs

Environment Canada
Canadian Parks Service

Modifications

A. No du détail	A	A. Detail no
B. Localisation	B/C	B. Localisation
C. Sur feuille no		C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par
Azarie Lavigne
Yvon Laframboise

Checked by

Approuvé par _____ Approved by _____

Chargé du projet _____ Job Captain

Azarie Lavigne

Chef de section _____ Section head

Jean-Claude Langlois

Gérant de secteur _____ Area manager

Pierre Parent

Projet _____ Project

CANAL CHAMBLY
ECLUSE No. 1-2-3
MECANISME DE VANNES

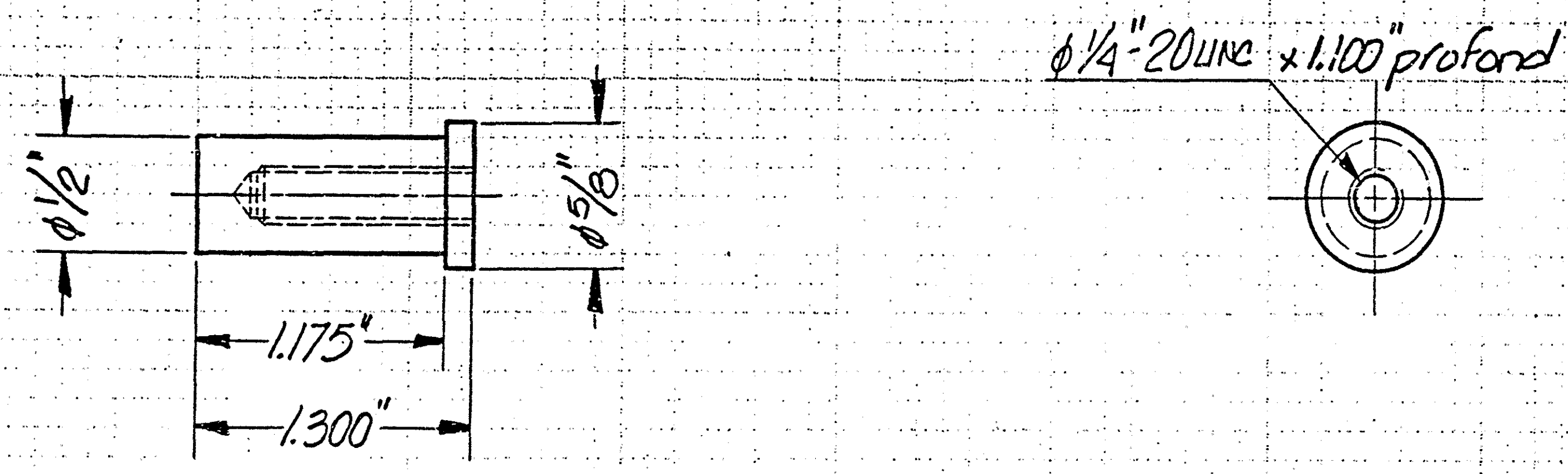
Titre du dessin _____ Drawing Title

ARBRE DU MECA-
NISME ANTI-RECOLE
RU-C-23-161.47

Date
90-10-02

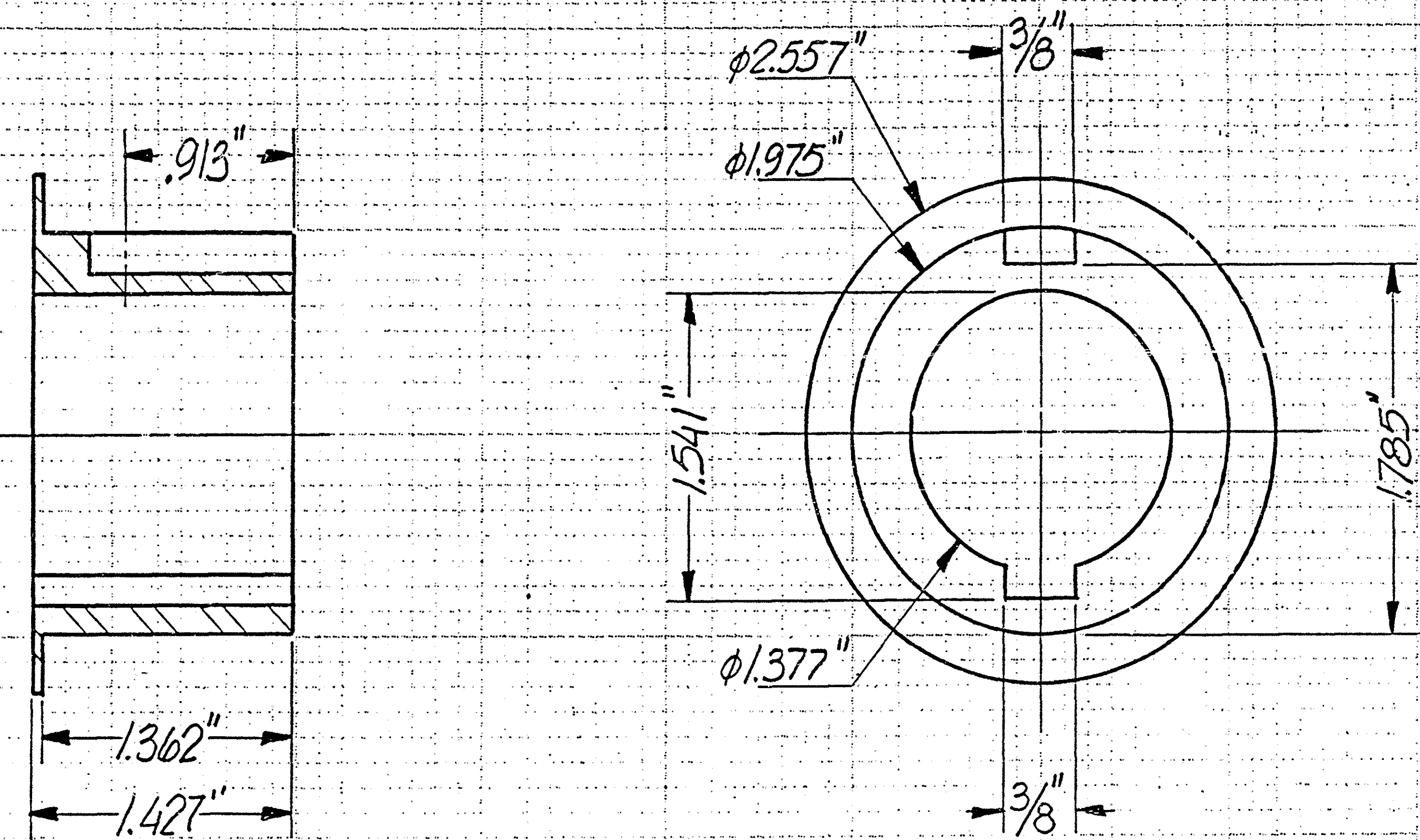
Echelle _____ Scale
47/52
Sheet

No. de référence _____ Reference no.



MATERIEL
ACIER LAMINE A
CHAUD C-1020

Modifications	
A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no
Dessiné par	Drawn by
Conçu par	Design by
Vérifié par Azarie Lavigne Yvon Laframboise	Checked by
Approuvé par	Approved by
Chargé du projet	Job Captain
Azarie Lavigne	
Chef de section	Section head
Jean-Claude Langlois	
Gérant de secteur	Area manager
Pierre Parent	
Projet	Project
CANAL CHAMBLY	
ECLUSE No.1-2-3	
MECANISME DE VANNES	
Titre du dessin	Drawing Title
BUTOIR MECANISME ANTI-RECALE RU-C-23-16/48	
Date	Feuille
90-10-02	48/
Echelle	Scale
	1/52 Sheet
No. de référence	Reference no.



MATERIEL
ACIER LAMINE A
CHAUD C-1020

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

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Conçu par _____ Design by _____

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Approuvé par _____ Approved by _____

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Jean-Claude Langlois

Gérant de secteur
Pierre Parent

Projet
CANAL CHAMBLY
ECLUSE No.1-2-3
MECANISME DE VANNES

Titre du dessin
PIECE MECANISME
ANTI-RECULE
RU-C-23-161.49

Date
90-10-02

Echelle
Scale

No. de référence
Reference no.

Feuille
49/
52
Sheet

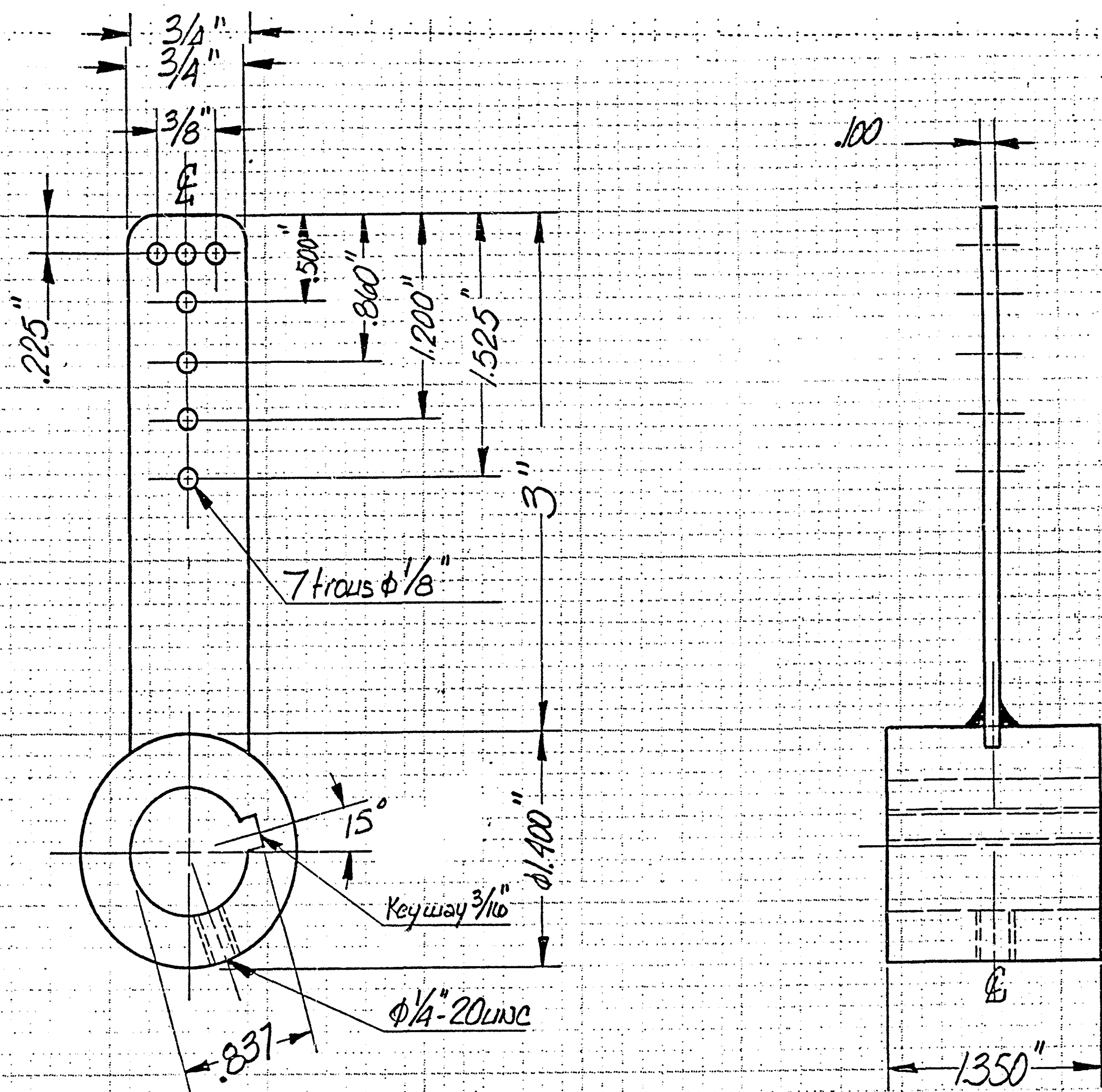


Environnement
Canada

Environment
Canada

Service Canadien
des Parcs

Canadian Parks
Service



MATERIEL
ACIER LAMINE A
CHAUD 1045

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

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Conçu par Design by

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Yvon Laframboise

Approuvé par Approved by

Chargé du projet Job Captain

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Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

Projet Project

CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

LEVIER DU MECA-
NISME ANTI-RECULE
RU-C-23-161.50

Date
90-10-02

Echelle Scale

Feuille
50/
52
Sheet

No. de référence

Reference no.

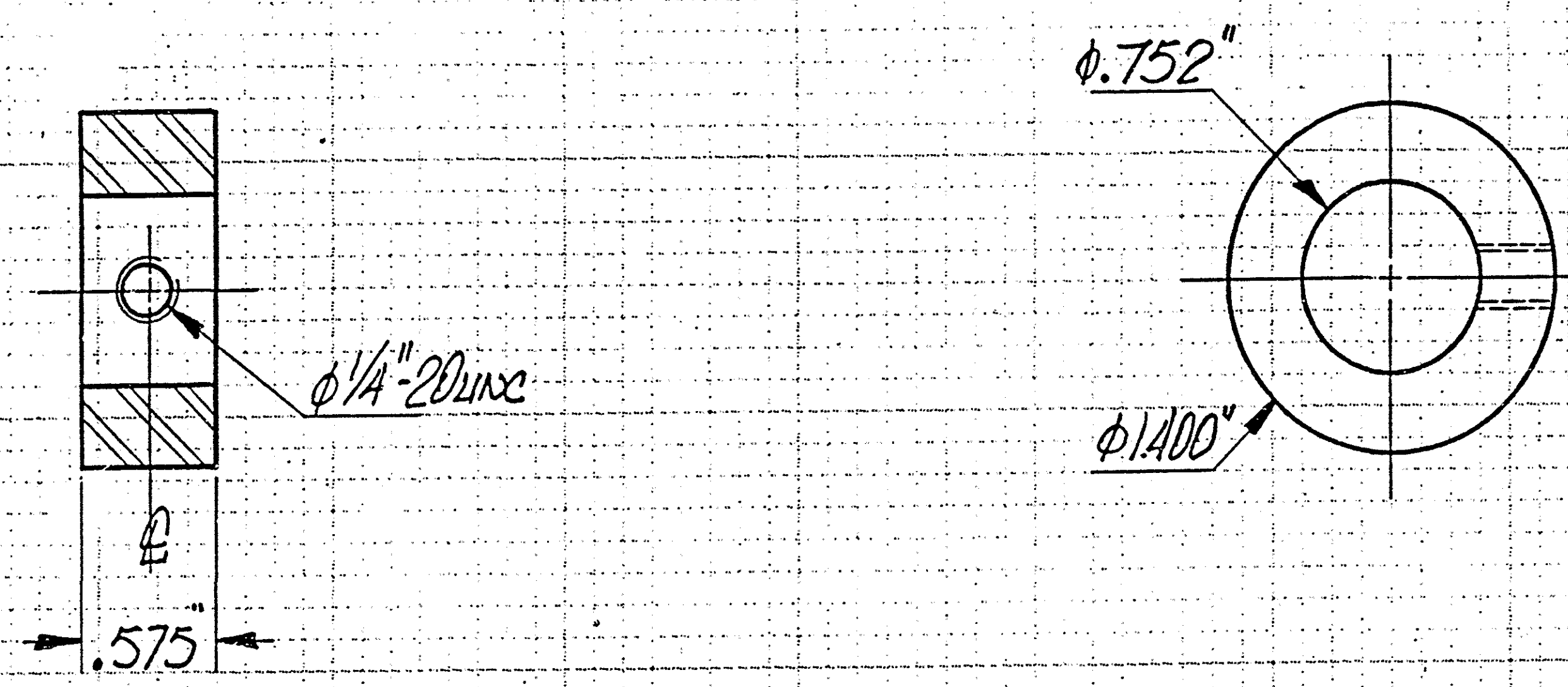


Environnement
Canada

Environment
Canada

Service Canadien
des Parcs

Canadian Parks
Service



MATERIEL
ACIER LAMINE A
CHAUD 1045

Modifications

A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no



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Jean-Claude Langlois

Gérant de secteur Area manager

Pierre Parent

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CANAL CHAMBLY

ECLUSE No.1-2-3

MECANISME DE VANNES

Titre du dessin Drawing Title

BUTOIR D'ARBRE
DE COUCHE MECA-
NISME ANTI-RECULE
RU-C-23-161.51

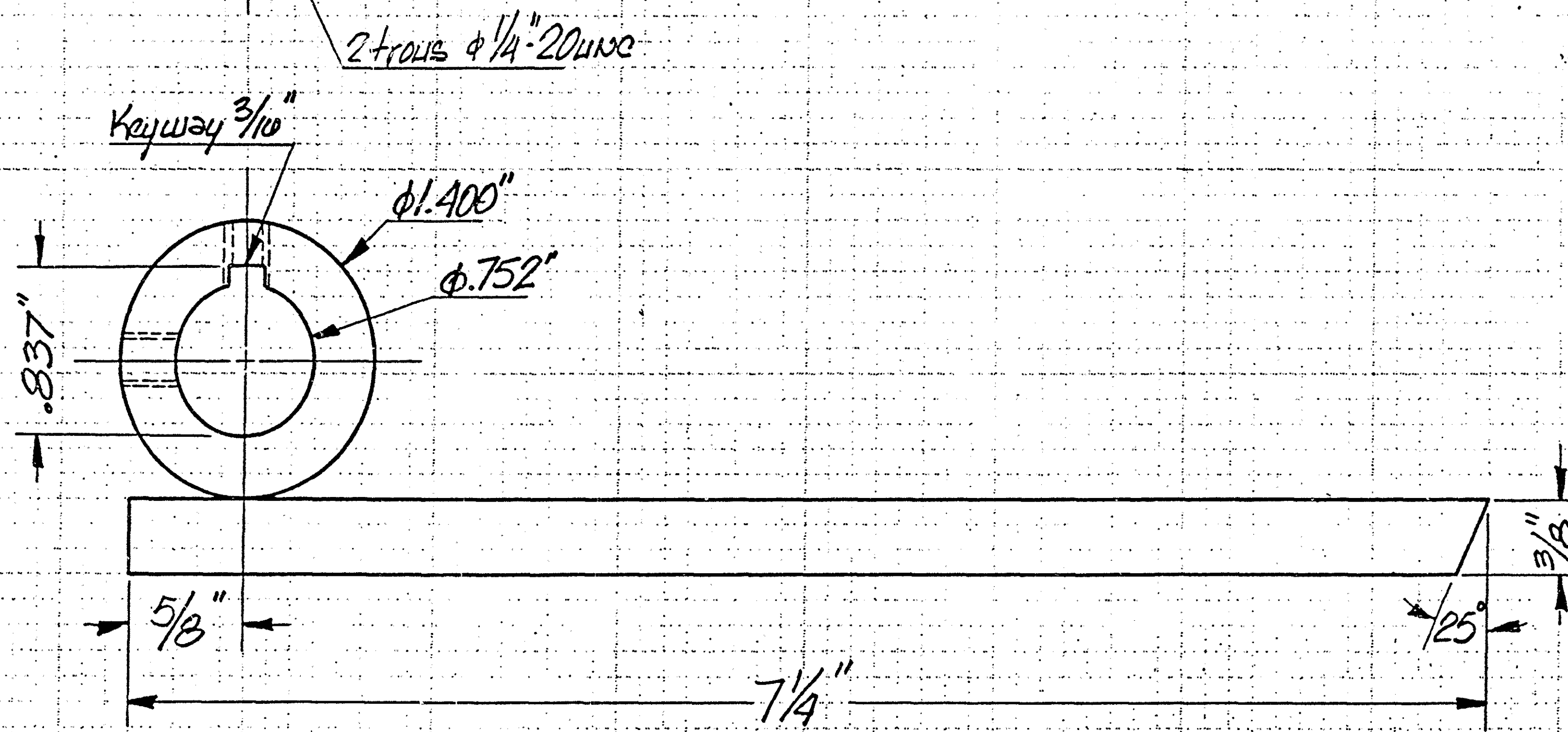
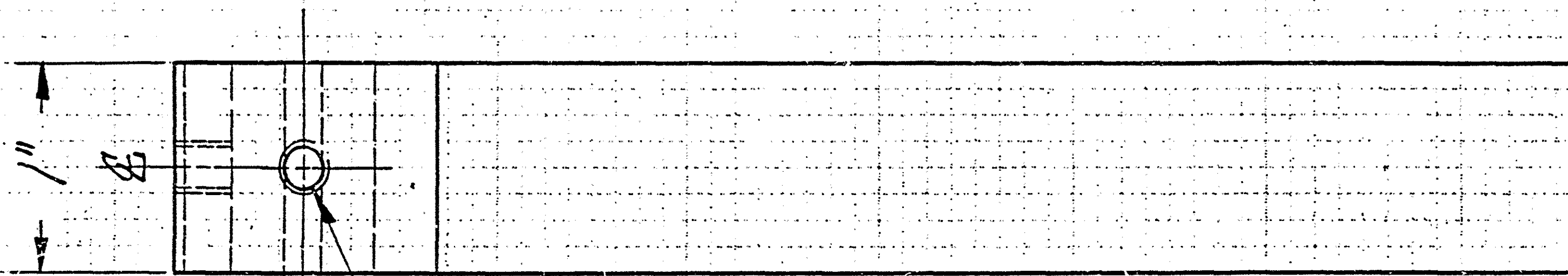
Date 90-10-02

Feuille 51/


Echelle Scale 1/52

Sheet

No. de référence Reference no.



MATERIEL
 ACIER LAMINE A
 CHAUD C-1020



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 Environment Canada
 Service Canadien des Parcs
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Modifications	
A. No du détail	A. Detail no
B. Localisation	B. Localisation
C. Sur feuille no	C. On sheet no

Dessiné par _____ Drawn by _____

Conçu par _____ Design by _____

Vérifié par
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 Yvon Laframboise

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Chef de section
 Jean-Claude Langlois

Gérant de section
 Pierre Parent

Projet
 CANAL CHAMBLY
 ECLUSE No.1-2-3
 MECANISME DE VANNES

Titre du dessin
 Drawing Title
 CLIQUET DU MECA-
 NISME ANTI-RECULE
 RU-C-23-161.52

Date 90-10-02 Feuille 52/

Echelle _____ Scale 1/52 Sheet

No. de référence _____ Reference no.