



RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Travaux publics et Services gouvernementaux
Canada
Voir dans le document/
See herein
NA
Québec
NA

REQUEST FOR PROPOSAL
DEMANDE DE PROPOSITION

Proposal To: Public Works and Government Services Canada

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out therefor.

Proposition aux: Travaux Publics et Services Gouvernementaux Canada

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexée, au(x) prix indiqué(s).

Comments - Commentaires

Title - Sujet Hydraulic Test Bench System	
Solicitation No. - N° de l'invitation W1985-212030/A	Date 2020-10-15
Client Reference No. - N° de référence du client W1985-212030	
GETS Reference No. - N° de référence de SEAG PW-\$MTA-170-15883	
File No. - N° de dossier MTA-0-43044 (170)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2020-11-30	Time Zone Fuseau horaire Heure Normale du l'Est HNE
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input checked="" type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à: Cimpan, Cristina	Buyer Id - Id de l'acheteur mta170
Telephone No. - N° de téléphone (514) 604-3855 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: BLU 6769 NOTRE DAME EST MONTREAL Québec H1N 2E9 Canada	

Instructions: See Herein

Instructions: Voir aux présentes

Vendor/Firm Name and Address

Raison sociale et adresse du fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution

Travaux publics et Services gouvernementaux Canada
Place Bonaventure, portail Sud-Oue
800, rue de La Gauchetière Ouest
7e étage, suite 7300
Montréal
Québec
H5A 1L6

Delivery Required - Livraison exigée Voir doc.	Delivery Offered - Livraison proposée
Vendor/Firm Name and Address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Telephone No. - N° de téléphone Facsimile No. - N° de télécopieur	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)	
Signature	Date

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Amd. No. - N° de la modif.
File No. - N° du dossier
MTA-0-43044

Buyer ID - Id de l'acheteur
MTA170
CCC No./N° CCC - FMS No./N° VME

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PART 1 - GENERAL INFORMATION

1.1 Security Requirements

1. Before award of a contract, the following conditions must be met:
 - (a) the Bidder must hold a valid organization security clearance as indicated in Part 6 - Resulting Contract Clauses;
 - (b) the Bidder's proposed individuals requiring access to classified or protected information, assets or sensitive work sites must meet the security requirements as indicated in Part 6 - Resulting Contract Clauses;
 - (c) the Bidder must provide the name of all individuals who will require access to classified or protected information, assets or sensitive work sites;
2. Bidders are reminded to obtain the required security clearance promptly. Any delay in the award of a contract to allow the successful Bidder to obtain the required clearance will be at the entire discretion of the Contracting Authority.
3. For additional information on security requirements, Bidders should refer to the [Contract Security Program](http://www.tpsgc-pwgsc.gc.ca/esc-src/introduction-eng.html) of Public Works and Government Services Canada (<http://www.tpsgc-pwgsc.gc.ca/esc-src/introduction-eng.html>) website.

1.2 Requirement

The requirement is detailed under Annex «**A**» - Requirement.

1.3 Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

1.4 epost Connect service

This bid solicitation allows bidders to use the epost Connect service provided by Canada Post Corporation to transmit their bid electronically. Bidders must refer to Part 2 entitled Bidder Instructions, and Part 3 entitled Bid Preparation Instructions, of the bid solicitation, for further information.

PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The [2003](#) (2020-05-28) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

Subsection 5.4 of [2003](#), Standard Instructions - Goods or Services - Competitive Requirements, is amended as follows:

Delete: 60 days
Insert: 180 days

2.1.1 SACC Manual Clauses

[B1000T](#) (2014-06-26), Condition of Material – Bid
[A7035T](#) (2007-05-25), List of Proposed Subcontractors

2.2 Submission of Bids

Bids must be submitted only to the Public Works and Government Services Canada (PWGSC) Bid Receiving Unit specified below by the date and time indicated on page 1 of the bid solicitation:

PWGSC Québec Region Bid Receiving Unit

Only bids submitted using epost Connect service will be accepted. The Bidder must send an email requesting to open an epost Connect conversation to the following address:

TPSGC.RQReceptionSoumissions-QRSupplyTendersReception.PWGSC@tpsgc-pwgsc.gc.ca

Note: **Bids will not be accepted if emailed directly to this email address.** This email address is to be used to open an epost Connect conversation, as detailed in Standard Instructions [2003](#), or to send bids through an epost Connect message if the bidder is using its own licensing agreement for epost Connect.

It is the Bidder's responsibility to ensure the request for opening an epost Connect conversation is sent to the email address above at least six days before the solicitation closing date.

For more information on the use of Postel, please see the following link:

<https://buyandsell.gc.ca/steps-to-follow-for-the-bid-submission-to-bid-receiving-unit-bru-using-epost-connect>

Bids transmitted by facsimile or hardcopy to PWGSC will not be accepted.

2.3 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than seven (7) calendar days before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by Bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

2.4 Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Québec.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the Bidders.

2.5 Optional Site Visit

It is recommended that the Bidder or a representative of the Bidder visit the work site. Arrangements have been made for the site visit to be held at 202e Dépôt d'atelier, 6769 Notre Dame Est, Building 3, Montréal, QC H1N 2E9 on **November 3, 2020**. The site visit will begin at 10:00 EST.

Bidders must communicate with the Contracting Authority no later than **October 30, 2020**, 16h00 to confirm attendance and provide the name(s) of the person(s) who will attend. Bidders who do not confirm attendance and who do not provide the name(s) of the person(s) who will attend as required will not be allowed access to the site. Bidders will be requested to sign an attendance sheet. No alternative appointment will be given to bidders who do not attend or do not send a representative. Bidders who do not participate in the visit will not be precluded from submitting a bid. Any clarifications or changes to the bid solicitation resulting from the site visit will be included as an amendment to the bid solicitation.

2.6 Bid Challenge and Recourse Mechanisms

- (a) Several mechanisms are available to potential suppliers to challenge aspects of the procurement process up to and including contract award.
- (b) Canada encourages suppliers to first bring their concerns to the attention of the Contracting Authority. Canada's [Buy and Sell](#) website, under the heading "[Bid Challenge and Recourse Mechanisms](#)" contains information on potential complaint bodies such as:
 - Office of the Procurement Ombudsman (OPO)
 - Canadian International Trade Tribunal (CITT)
- (c) Suppliers should note that there are **strict deadlines** for filing complaints, and the time periods vary depending on the complaint body in question. Suppliers should therefore act quickly when they want to challenge any aspect of the procurement process.

PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

The Bidder must submit its bid electronically in accordance with section 08 of the 2003 standard instructions. The epost Connect system has a limit of 1GB per single message posted and a limit of 20GB per conversation.

The bid must be gathered per section and separated as follows:

Section I: Technical Bid
Section II: Financial Bid
Section III: Certifications

Bids transmitted by facsimile or hardcopy will not be accepted.

Prices must appear in the financial bid only. No prices must be indicated in any other section of the bid.

Section I: Technical Bid

In their technical bid, Bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

Section II: Financial Bid

Bidders must submit their financial bid in accordance with the Basis of Payment.

3.1.1 Electronic Payment of Invoices – Bid

If you are willing to accept payment of invoices by Electronic Payment Instruments, complete Annex “E” Electronic Payment Instruments, to identify which ones are accepted.

If Annex “E” Electronic Payment Instruments is not completed, it will be considered as if Electronic Payment Instruments are not being accepted for payment of invoices.

Acceptance of Electronic Payment Instruments will not be considered as an evaluation criterion.

3.1.2 Exchange Rate Fluctuation

[C3011T](#) (2013-11-06), Exchange Rate Fluctuation

3.1.3 SACC Manual Clauses

Section III: Certifications

Bidders must submit the certifications and additional information required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.1.1 Technical Evaluation

The bidder is reminded to provide as much technical information and documentation as possible, so as to fully demonstrate technical compliance to all elements of the solicitation, otherwise proposal may be deemed noncompliant (non-responsive) for insufficient information.

4.1.1.1 Mandatory Technical Criteria

The technical evaluation will be based on the mandatory technical criteria to be demonstrated detailed in the Annex D.

Bidders must demonstrate each of these mandatory technical criteria with documents and/or brochures and/or technical drawings, which must be submitted with their proposal.

Bidders must complete the grid in Annex D and include it with their proposal.

4.1.2 Financial Evaluation

According to the Total Price indicated at the section 2.0 of Annex B - Basis of Payment.

4.1.2.1 SACC Manual Clause

[A0222T](#) (2014-06-26), Evaluation of Price-Canadian/Foreign Bidders

4.2 Basis of Selection

4.2.1 SACC Manual Clause

[A0031T](#) (2010-08-16), Basis of Selection - Mandatory Technical Criteria

PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

Bidders must provide the required certifications and additional information to be awarded a contract.

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

5.1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, **if applicable**, the declaration form available on the [Forms for the Integrity Regime](http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html) website (<http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>), to be given further consideration in the procurement process.

5.2 Certifications Precedent to Contract Award and Additional Information

The certifications and additional information listed below should be submitted with the bid, but may be submitted afterwards. If any of these required certifications or additional information is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to provide the certifications or the additional information listed below within the time frame provided will render the bid non-responsive.

5.2.1 Integrity Provisions – Required Documentation *(see Annex F)*

In accordance with the section titled Information to be provided when bidding, contracting or entering into a real property agreement of the [Ineligibility and Suspension Policy](http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

5.2.2 Federal Contractors Program for Employment Equity - Bid Certification *(see Annex G)*

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available at the bottom of the page of the [Employment and Social Development Canada \(ESDC\) - Labour's](https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#) website (<https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#>).

Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.

Canada will also have the right to terminate the Contract for default if a Contractor, or any member of the Contractor if the Contractor is a Joint Venture, appears on the "[FCP Limited Eligibility to Bid](#)" list during the period of the Contract.

The Bidder must provide the Contracting Authority with a completed annex titled Federal Contractors Program for Employment Equity - Certification, before contract award. If the Bidder is a Joint Venture, the Bidder must provide the Contracting Authority with a completed annex Federal Contractors Program for Employment Equity - Certification, for each member of the Joint Venture.

5.2.3 Additional Certifications Precedent to Contract Award

5.2.3.1 Certification - Original Equipment Manufacturer (OEM)

- a) Any Bidder that is not the Original Equipment Manufacturer (OEM) for every item proposed as part of its bid is required to submit a certificate signed by the OEM (not the bidder) certifying the bidder's authority to provide and maintain the OEM's items. No Contract will be awarded to a Bidder that is not the original equipment manufacturer of the items proposed to Canada unless the manufacturer certification has been provided to Canada.
- b) If the equipment proposed by the Bidder originates with multiple OEMs, a separate OEM certification is required from each OEM.
- c) For the purposes of this bid solicitation, OEM means the manufacturer of the equipment, as evidenced by the name appearing on the equipment and on all accompanying documentation.

5.3 Financial requirements

5.3.1 Financial Capability

SACC Manual Clause [A9033T](#) (2012-07-16) Financial Capability

PART 6 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

6.1 Security Requirements

6.1.1 The following security requirements (SRCL and related clauses provided by the Contract Security Program) apply and form part of the Contract.

1. The Contractor/Offeror must, at all times during the performance of the Contract/Standing Offer, hold a valid Designated Organization Screening (DOS), issued by the Contract Security Program (CSP), Public Works and Government Services Canada (PWGSC).
2. The Contractor/Offeror personnel requiring access to sensitive site(s) must EACH hold a valid RELIABILITY STATUS, granted or approved by the CSP, PWGSC.
3. Subcontracts which contain security requirements are NOT to be awarded without the prior written permission of the CSP, PWGSC.
4. The Contractor/Offeror must comply with the provisions of the:
 - a) Security Requirements Check List and security guide (if applicable), attached at Annex C;
 - b) *Industrial Security Manual* (Latest Edition).

6.1.2 SECURITY REQUIREMENTS FOR FOREIGN SUPPLIERS

The Canadian Designated Security Authority (Canadian DSA) for industrial security matters in Canada is the Industrial Security Sector (ISS), Public Works and Government Services Canada (PWGSC), administered by International Industrial Security Directorate (IISD), PWGSC. The Canadian DSA is the authority for confirming Contractor/Subcontractor compliance with the security requirements for foreign suppliers. The following security requirements apply to the foreign recipient Contractor/Subcontractor incorporated or authorized to do business in a jurisdiction other than Canada and delivering outside of Canada the services listed and described in the subsequent contract/subcontract.

1. The Foreign recipient Contractor/Subcontractor must be from a Country within the North Atlantic Treaty Organization (NATO), the European Union (EU) or from a country with which Canada has an international bilateral security instrument. The Contract Security Program (CSP) has international bilateral security instruments with the countries listed on the following PWGSC website:
<http://www.tpsgc-pwgsc.gc.ca/esc-src/international-eng.html>.
2. The Foreign recipient Contractor/Subcontractor must, at all times during the performance of the contract/subcontract, hold an equivalence to a valid Designated Organization Screening (DOS), issued by the Canadian DSA as follows:
 - i. The Foreign recipient Contractor/Subcontractor must provide proof that they are incorporated or authorized to do business in their jurisdiction.

-
- ii. The Foreign recipient Contractor/Subcontractor must not begin the work, services or performance until the Canadian Designated Security Authority (DSA) is satisfied that all contract security requirement conditions have been met. Canadian DSA confirmation must be provided, in writing, to the foreign recipient Contractor/Subcontractor in an Attestation Form, to provide confirmation of compliance and authorization for services to be performed.
 - iii. The Foreign recipient Contractor/Subcontractor must identify an authorized Contract Security Officer (CSO) and an Alternate Contract Security Officer (ACSO) (if applicable) to be responsible for the overseeing of the security requirements, as defined in this contract. This individual will be appointed by the proponent foreign recipient Contractor's/Subcontractor's Chief Executive officer or Designated Key Senior Official, defined as an owner, officer, director, executive, and or partner who occupy a position which would enable them to adversely affect the organization's policies or practices in the performance of the contract/subcontract.
 - iv. The Foreign recipient Contractor/Subcontractor must not permit access to Canadian restricted sites, except to its personnel subject to the following conditions:
 - a. Personnel have a need-to-know for the performance of the contract/subcontract;
 - b. Personnel have been subject to a Criminal Record Check, with favourable results, from a recognized governmental agency or private sector organization in their country as well as a Background Verification, validated by the Canadian DSA;
 - c. The Foreign recipient Contractor/Subcontractor must ensure that personnel provide consent to share results of the Criminal Record and Background Checks with the Canadian DSA and other Canadian Government Officials, if requested; and
 - d. The Government of Canada reserves the right to deny access to Canadian restricted sites to a foreign recipient Contractor/Subcontractor for cause.
3. CANADA PROTECTED information/assets provided or generated pursuant to this contract/subcontract must not be further provided to a third party Foreign recipient Subcontractor unless:
- a. written assurance is obtained from the Canadian DSA to the effect that the third-party Foreign recipient Subcontractor has been approved for access to CANADA PROTECTED information/assets by the Canadian DSA; and
 - b. written consent is obtained from the Canadian DSA, if the third-party Foreign recipient Subcontractor is located in a third country.
4. The foreign recipient Contractor/Subcontractor requiring access to Canadian restricted sites, under this contract/subcontract, must submit a Request for Site Access to the Chief Security Officer of the Department of National Defence Canada.
5. In the event that a Foreign recipient Contractor/Subcontractor is chosen as a supplier for this contract/subcontract, subsequent country-specific foreign security requirement clauses must be generated and promulgated by the Canadian DSA, and provided to the Government of Canada Contracting Authority, to ensure compliance with the security provisions, as defined by the Canadian DSA, in relation to equivalencies.
6. Subcontracts which contain security requirements are NOT to be awarded without the prior written permission of the Canadian DSA.

-
7. The Foreign recipient Contractor/Subcontractor must comply with the provisions of the Security Requirements Check List attached at Annex C.

6.2 Requirement

The Contractor must provide the items detailed under the "Requirement" at Annex "A".

6.3 Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

6.3.1 General Conditions

[2030](#) (2020-05-28), General Conditions - Higher Complexity - Goods, apply to and form part of the Contract.

6.3.1.1 Warranty Period

Section 22 of general conditions [2030](#) (2020-05-28) is amended by replacing the period of 12 months by 24 months.

All other provisions of the warranty section remain in effect.

6.3.1.2 Warranty - Modification - General Conditions 2030

Section 22 entitled Warranty of general conditions 2030 is amended by deleting subsections 3 and 4 in its entirety and replacing it with the following:

3. The Work or any part of the Work found to be defective or non-conforming will be returned to the Contractor's plant for replacement, repair or making good. However, when in the opinion of Canada it is not expedient to remove the Work from its location, the Contractor must carry out any necessary repair or making good of the Work at that location. In such cases, the Contractor will be responsible for all Costs (including travel and living expenses) incurred in so doing, Canada will not reimburse these Costs.
4. The Contractor must pay the transportation cost associated with returning the Work or any part of the Work to the Contractor's plant pursuant to subsection 3. The Contractor must also pay the transportation cost associated with forwarding the replacement or returning the Work or part of the Work when rectified to the delivery point specified in the Contract or to another location directed by Canada.

All other provisions of the warranty section remain in effect.

6.3.2 Supplemental General Conditions

[4001](#) (2015-04-01), Hardware Purchase, Lease and Maintenance, apply to and form part of the Contract.
[4002](#) (2010-08-16), Software Development or Modification Services, apply to and form part of the Contract.

6.3.2.1 Warranty Period

Section 14 of supplemental general conditions [4001](#) (2015-04-01), Hardware Purchase, Lease and Maintenance is amended by replacing the period of 12 months by 24 months.

Section 12 of supplemental general conditions [4002](#) (2010-08-16), Software Development or Modification Services is amended by replacing the period of 90 days months by 24 months.

All other provisions of the warranty section remain in effect.

6.4 Term of Contract

6.4.1 Period of the Contract

The period of the Contract is from the date of Contract to _____ inclusive (*the date will be filled at contract award*).

6.4.2 Delivery Date

All the deliverables must be received on or before _____ (*the date will be filled at contract award*).

6.4.3 Delivery Points

Delivery of the requirement will be made to delivery point(s) specified at Annex "A" of the Contract.

6.5 Authorities

6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Cristina Cimpan
Title: Acting Procurement Agent
Public Works and Government Services Canada
Acquisitions Branch Directorate Supply
Telephone: 514-604-3855
E-mail address: cristina.cimpan@tpsgc-pwgsc.gc.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

6.5.2 Project Authority *(to be completed by Canada at contract award)*

The Project Authority for the Contract is:

Name: _____
Title: _____
Organization: _____
Address: _____
Telephone: ____-____-_____
Facsimile: ____-____-_____
E-mail address: _____

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority, however the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

6.5.3 Contractor's Representative *(to be filled by the bidder)*

Name: _____
Title: _____
Organization: _____
Address: _____
Telephone: _____
Facsimile: _____
E-mail address: _____

6.6 Payment

6.6.1 Basis of Payment - Firm Price, Firm Unit Price(s) or Firm Lot Price(s)

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid firm unit prices, as specified in Annex B for a cost of \$ _____ *(will be indicated at the contract award)*. Customs duties are included and Applicable Taxes are extra.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work, unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

6.6.2 Milestone Payments - Not subject to holdback

Canada will make milestone payments in accordance with the Schedule of Milestones detailed in the Contract and the payment provisions of the Contract if:

- a. an accurate and complete claim for payment using [PWGSC-TPSGC 1111](#), Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- b. all the certificates appearing on form [PWGSC-TPSGC 1111](#) have been signed by the respective authorized representatives;
- c. all work associated with the milestone and as applicable any deliverable required has been completed and accepted by Canada.

6.6.3 Schedule of Milestones

The schedule of milestones for which payments will be made in accordance with the Contract is detailed in Annex B.

6.6.4 SACC Manual Clauses

[C2000C](#) (2007-11-30), Taxes - Foreign-based Contractor

6.6.5 Electronic Payment of Invoices – Contract *(Annex E)*

The Contractor accepts to be paid using any of the following Electronic Payment Instrument(s):

- a. Visa Acquisition Card;
- b. MasterCard Acquisition Card;
- c. Direct Deposit (Domestic and International);
- d. Electronic Data Interchange (EDI).

6.7 Invoicing Instructions

6.7.1 Invoicing Instructions - Progress Payment Claim - Supporting Documentation not required

1. The Contractor must submit a claim for payment using form [PWGSC-TPSGC 1111](#), Claim for Progress Payment.
Each claim must show:
 - a. all information required on form [PWGSC-TPSGC 1111](#);
 - b. all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
 - c. the description and value of the milestone claimed as detailed in the Contract.
2. Applicable Taxes, must be calculated on the total amount of the claim before the holdback is applied. At the time the holdback is claimed, there will be no Applicable Taxes payable as it was claimed and payable under the previous claims for progress payments.
3. The Contractor must prepare and certify one original and two (2) copies of the claim on form [PWGSC-TPSGC 1111](#), and forward it to the Project Authority identified under the section entitled "Authorities" of the Contract for appropriate certification after inspection and acceptance of the Work takes place.
The Project Authority will then forward the original and two (2) copies of the claim to the Contracting Authority for certification and onward submission to the Payment Office for the remaining certification and payment action.
4. The Contractor must not submit claims until all work identified in the claim is completed.

6.8 Certifications and Additional Information

6.8.1 Compliance

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

6.8.2 Federal Contractors Program for Employment Equity - Default by the Contractor

The Contractor understands and agrees that, when an Agreement to Implement Employment Equity (AIEE) exists between the Contractor and Employment and Social Development Canada (ESDC)-Labour, the AIEE must remain valid during the entire period of the Contract. If the AIEE becomes invalid, the name of the Contractor will be added to the "[FCP Limited Eligibility to Bid](#)" list. The imposition of such a sanction by ESDC will constitute the Contractor in default as per the terms of the Contract.

6.9 Applicable Laws *(to be filled by the bidder)*

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in _____ *(insert the name of the CANADIAN province or territory)*.

6.10 Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) the Articles of Agreement;
- (b) the supplemental general conditions [4001](#) (2015-04-01), Hardware Purchase, Lease and Maintenance;
- (c) the supplemental general conditions [4002](#) (2010-08-16), Software Development or Modification Services;
- (d) the general conditions [2030](#) (2020-05-28), General Conditions - Higher Complexity - Goods;
- (e) Annex A, Requirement;
- (f) Annex B, Basis of payment;
- (g) Annex C, Security Requirements Check List;
- (h) the Contractor's bid dated _____ *(insert date of bid)*.

6.11 SACC Manual Clauses

[A2000C](#) (2006-06-16), Foreign Nationals (Canadian Contractor)
[A2001C](#) (2006-06-16), Foreign Nationals (Foreign Contractor)
[A9062C](#) (2011-05-16), Canadian Forces Site Regulations
[B1501C](#) (2018-06-21), Electrical equipment
[B7500C](#) (2006-06-16), Excess Goods
[D0018C](#) (2007-11-30), Delivery and Unloading

6.12 Inspection and Acceptance

The Project Authority is the Inspection Authority. All reports, deliverable items, documents, goods and all services rendered under the Contract are subject to inspection by the Inspection Authority or representative. Should any report, document, good or service not be in accordance with the requirements of the Statement of Work and to the satisfaction of the Inspection Authority, as submitted, the Inspection Authority will have the right to reject it or require its correction at the sole expense of the Contractor before recommending payment.

6.13 Insurance Requirements

SACC Manual clause [G1005C](#) (2016-01-28), Insurance - No Specific Requirement

6.14 Dispute Resolution

- (a) The parties agree to maintain open and honest communication about the Work throughout and after the performance of the contract.
- (b) The parties agree to consult and co-operate with each other in the furtherance of the contract and promptly notify the other party or parties and attempt to resolve problems or differences that may arise.

Solicitation No. - N° de l'invitation
W1985-212030/A
Client Ref. No. - N° de réf. du client
W1985-212030

Amd. No. - N° de la modif.
File No. - N° du dossier
MTA-0-43044

Buyer ID - Id de l'acheteur
MTA170
CCC No./N° CCC - FMS No./N° VME

- (c) If the parties cannot resolve a dispute through consultation and cooperation, the parties agree to consult a neutral third party offering alternative dispute resolution services to attempt to address the dispute.
- (d) Options of alternative dispute resolution services can be found on Canada's Buy and Sell website under the heading "[Dispute Resolution](#)".

ANNEX "A"

REQUIREMENT

1.0 SCOPE

1.1 SUBJECT

The hydraulic shop located in the facilities of "202 Workshop Depots" (202WD) in Montréal, QC is seeking to acquire an entirely operational hydraulic test bench system that is designed, supplied, installed, and commissioned in accordance with the requirements specified in this Annex.

1.2 EQUIPMENT TO BE TESTED

The equipment to be tested on the hydraulic test bench includes hydraulic accumulators, motors, pumps (including submersible pumps), linear actuators, cylinders, pistons, hydrostatic transmissions, and valves (directional, proportional, and servovalves).

1.3 DESCRIPTION OF WORKS

The works to be carried out as part of this contract include but are not limited to:

1.3.1 Make technical revisions to the system in conjunction with shop personnel at 202WD. In collaboration with the representative of 202WD, identify and respond to requirements relating to the building's system to be installed in the shop prior to the installation of the hydraulic test bench system.

1.3.2 Design, perform engineering tasks, build, and supply a hydraulic test bench system that includes a test bench, equipment for the main motor, hydraulic tanks, piping systems, motor control equipment, electrical services, cooling and heating systems for hydraulic fluid, a data-acquisition system, and security accessories in accordance with the requirements specified in this document.

1.3.3 Deliver the hydraulic test bench system to:

Department of National Defence
202e Dépôt d'atelier
6769 Notre-Dame East Building 03
Montréal, QC H1N 2E9

1.3.4 Install the hydraulic test bench system, including connections with electrical and mechanical services in the main building. The hydraulic test bench system must be installed in the shop in accordance with the space limitations shown in the illustration at Annex A-4.

1.3.5 Test all systems installed to ensure that the hydraulic test bench system is fully functional prior to commissioning.

1.3.6 Perform commissioning and demonstrations and provide training on the use and maintenance of equipment and systems.

1.3.7 Provide a warranty as well as maintenance and operational support for a period of 24 months.

1.3.8 Provide cleaning and waste-disposal services.

1.4 CONTRACTOR QUALIFICATIONS

1.4.1 The Contractor must have at least five (5) years of confirmed experience in the design, manufacture, and installation of custom-made hydraulic test bench systems. The Contractor must supply proof of such experience, including at least the following information: company name, areas of activity, number of years of experience, and a list of the most important projects achieved in the past 5 years.

1.4.2 The Contractor must supply a list of at least two (2) projects of similar capacity and functionality from the past 10 years for which the Contractor designed and built hydraulic test bench systems. "Similar capacity and functionality" refers to projects for which the Contractor designed, supplied, installed, and

commissioned a hydraulic test bench system designed to test the equipment specified in Article 1.2 – Testing equipment. In addition, such test benches must possess at least the following characteristics:

- 1.4.2.1** Maximum supplied flow of at least 100 litres per minute at 230 bar;
- 1.4.2.2** Maximum supplied pressure of at least 300 bar at 90 litres per minute;
- 1.4.2.3** Independent adjustment of flow and pressure, by manual and digital means, and controlled by an electrical signal at the pump outlet;
- 1.4.2.4** Each outlet has its pressure indicator with a reading accuracy of at least 0.25%;
- 1.4.2.5** The value of the project must exceed \$750,000.

1.4.3 The Contractor must supply references for each project that appears on the aforementioned list at Article 1.4.2. The Contractor must supply at least the name and phone number or electronic mail address of one resource person. If only the phone number is supplied, it will be used to obtain the resource person's e-mail address since reference audits are conducted by electronic mail.

1.4.4 The Contractor must appoint a project manager as the only point of contact for all questions relating to the project. Within five (5) working days of the contract being awarded, the Contractor must supply the project manager's contact information to the project coordinator at 202WD.

1.4.5 The Contractor must supply a detailed project-delivery timetable to 202WD that includes all deliverables and all milestones identified in Annex B (Basis of payment) within 15 working days following signature of the contract. The calendar should be updated at least every month. The Contractor must complete all works within a period of two (2) years following the awarding of the contract.

1.5 CODES, STANDARDS AND PERMITS

1.5.1 The Contractor must carry out works in compliance with requirements in the latest edition of codes and standards in Annex A-1 of listed organizations, where appropriate, on the basis of structural systems and selected materials for the hydraulic test bench system and related structures and in accordance with the local and appropriate authority.

1.5.2 In the event of conflict or divergence, the strictest requirements apply.

1.6 REQUIRED SUBMISSIONS

1.6.1 The Contractor must submit high-quality electronic copies of all drawings and documents. All information and data must be provided on paper and in PDF, in both English and French. All PDF documents must be searchable. All documents must be pre-approved by the 202DA representative.

1.6.2 Shop drawings must include the following information:

- 1.6.2.1** General arrangement indicating size, operating clearance, and maintenance clearance for all equipment and components.
- 1.6.2.2** Weight and dimensions of all components.
- 1.6.2.3** Anchoring requirements for the equipment.
- 1.6.2.4** Design calculations.
- 1.6.2.5** Reference to relevant codes.
- 1.6.2.6** Information on the control and data-acquisition system.
- 1.6.2.7** Estimated noise levels for all pieces of equipment.
- 1.6.2.8** Piping and Instrumentation Diagram (P&ID) of the test bench and piping showing tanks, pumps, valves, meters, gauges, piping-test connections, controls, etc.
- 1.6.2.9** All documents must be signed and sealed by a professional engineer registered or chartered in the province of Québec in Canada.
- 1.6.2.10** Mechanical:
 - 1.6.2.10.1** Piping and assembly materials and installation methods.
 - 1.6.2.10.2** Performance data for the pump circuit.
 - 1.6.2.10.3** Performance data for the heat exchanger.
 - 1.6.2.10.4** Data sheet for the hydraulic fluid.
 - 1.6.2.10.5** Hydraulic piping diagrams showing all components, valves, and devices (label diagram components to provide reference to the shop drawings of the equipment).
 - 1.6.2.10.6** Piping diagrams relating to the heat-carrying fluid system (heating/cooling) showing all components, valves, and devices.

1.6.2.10.7 Service requirements for mechanical equipment (cooling loads, compressed-air requirements, etc.).

1.6.2.11 Electrical:

1.6.2.11.1 Electrical shop drawings must include a power-supply plan, a single-line diagram, quantity estimates, and a detailed wiring diagram.

1.6.2.11.2 The single-line wiring diagram must show all electrical devices and components.

1.6.2.11.3 Service requirements for all devices and components:

1.6.2.11.3.1 Scaling of the electrical system, calculation of on-demand loads and connected loads, voltage drops, breaking capacity, scale of the feeders, surge protection, overload protection, details regarding earthing/grounding, etc.

1.6.2.11.3.2 Motor control centre (MCC) including magnetic starters and motor controls.

1.6.2.11.3.3 Control diagrams, rectifiers, control-system component characteristics and options.

1.6.2.12 Seismic restraint drawings and calculations.

1.6.3 Prior to shipping, supply equipment assembly plans; see Article 3.7 in this Annex: Shipping, protection and storage.

1.7 CLOSURE DOCUMENTS

Along with delivery of the hydraulic test bench system, the Contractor must supply a complete manual that operators can use daily to test hydraulic equipment and components. English and French versions must be submitted to 202WD. The manual must include:

1.7.1 Installation overview.

1.7.2 Drawing showing the layout of all equipment and components.

1.7.3 Description of all equipment components.

1.7.4 Full written description of system operation. To complement text content in the manual, include:

1.7.4.1 Diagrams of all controls, piping, electrical wiring, etc.

1.7.4.2 Diagram of the central power supply.

1.7.4.3 Simplified general hydraulic diagram.

1.7.4.4 Hydraulic diagram of the feed pumps.

1.7.4.5 Diagram of the cooling system.

1.7.5 General view of the electrical system.

1.7.6 Test procedures for all systems, including procedures for specific manoeuvres and troubleshooting.

1.7.7 Detailed descriptions of the control systems and automation operations, including graphics screen copies and an explanation of graphics displays.

1.7.8 Revised shop drawings.

1.7.9 Products data.

1.7.10 Manufacturer, operating, and maintenance data.

1.7.11 Drawings of the hydraulic test bench showing all gauges, buttons, screens, valves, and so on as well as a description of the function of each component.

1.7.12 Maintenance timetable and preventive maintenance program, including instructions for equipment lubrication, adjustments, calibration and maintenance, detailed technical descriptions of operations, adjustment of electrical circuits, and mechanical lists.

1.7.13 Parts catalogue containing a full list of repair and replacement parts with cut-outs and identification numbers.

1.7.14 Names and addresses of suppliers of parts and lubricants; trade names of lubricants.

1.7.15 Troubleshooting information regarding malfunctions and defects.

1.7.16 Name and telephone number of the systems installer and its main technicians and supervisors.

1.8 MAINTENANCE-RELATED REQUIREMENTS AND DOCUMENTS/EQUIPMENT TO SUBMIT

1.8.1 The Contractor must supply maintenance-related requirements with sufficient detail to develop annual equipment-maintenance plans. The Contractor must supply the required documentation to enable 202WD to establish daily, weekly, monthly, annual, and long-term maintenance plans, classified by component and element.

1.8.2 Non-specific spare parts such as fuses and other fragile safety elements must be delivered to 202WD along with delivery of the bench.

1.8.2.1 Supply at least 5 spare fuses and other elements as well as all other fragile safety-related elements by specific type of element.

1.8.2.2 Supply 3 spare filters for each installed filter.

1.8.2.3 Supply a list of potential suppliers for each element mentioned above at 1.8.2 with their contact information.

1.9 3D SPATIAL REPRESENTATION OF THE TEST BENCH

1.9.1 *Prior to construction, the Contractor must supply a 3D file (of the type: .stl, .iam, .ipn or .idw) in a 1:1 scale of the hydraulic test bench showing the general arrangement, overall dimensions, and the arrangement of gauges and outlets.*

1.9.2 The 3D hydraulic test bench must be placed in its final position in a representation of the 202WD hydraulic workshop so that users can easily view the layout of the different bench systems.

1.9.3 The 202WD representative must submit comments to the Contractor.

1.9.4 The Contractor must make the necessary changes.

1.9.5 The 202WD representative must submit an authorization to proceed with final construction of the bench.

1.10 FACTORY TEST AND DEMONSTRATION

1.10.1 Once the 3D space representation of the hydraulic test bench has been reviewed and accepted, and the test bench has been constructed, the Contractor must ask a representative from 202WD come to the factory to witness the bench tests and demonstration.

1.10.2 The bench must be tested prior to shipping. The Contractor must submit the test reports to the 202WD representative.

1.10.3 The purpose of the factory test and demonstration is to confirm the following before delivering the bench to site:

1.10.3.1 General layout, materials and bench finishes.

1.10.3.2 Location of all components.

1.10.3.3 Accessibility conditions of all maintenance components.

1.10.3.4 Pressure testing of all components, piping, and valves.

1.10.3.5 Demonstration of the control and monitoring system, including all graphics, using hydraulic, electrical, and control systems to test a representative hydraulic component.

1.10.4 The 202WD representative must submit a report following the factory visit, confirming any changes that may be necessary as a result of testing and demonstration.

1.11 MEETINGS TO ASSESS PROGRESS AND APPROVE PROJECT MILESTONES

The Contractor must include three separate design review meetings, as described below:

1.11.1 First meeting (prior to submitting shop drawings): a two-day meeting with 202WD shop personnel to review the following requirements and systems:

1.11.1.1 Bench layout, including gauge, display, and port layout.

1.11.1.2 Test the content and layout of generated reports.

1.11.1.3 Main motor chamber layout (prime mover).

1.11.1.4 Pump arrangement, single and multiple capacities.

1.11.1.5 Piping layout.

1.11.1.6 Electrical equipment layout.

1.11.1.7 Sequence of operations.

1.11.1.8 Control system components, functionalities, and options.

1.11.2 Second meeting: a two-day meeting with 202WD shop personnel to assess progress – 50% complete and all follow-up changes or actions arising from the first meeting.

1.11.3 Third meeting: a two-day meeting with 202WD shop personnel to assess progress – 95% complete. There must be no outstanding items at this point.

1.11.4 The first meeting must take place at the 202WD premises. The Contractor must pay all travel and living expenses for him or herself and any representatives who attend the meeting.

1.11.5 Meetings 2 and 3 must be held at the bench manufacturing plant. 202 DA will be responsible for all travel and living expenses for its staff.

1.12 PERFORMANCE REQUIREMENTS

1.12.1 The new hydraulic test bench system must validate the performance of high-pressure hydraulic components post-repair or overhaul and prior to their return to service or storage.

1.12.2 The installation must provide the operator with the possibility of controlling the load of the device undergoing testing and measuring the parasitic outputs and losses, thereby establishing the efficiency of the device under conditions that may be equivalent to actual operating conditions.

1.12.3 The measured results must be able to be compared with the required performance, thereby enabling decision-making to validate the item for repair or carry out a new overhaul until performance criteria are met.

1.12.4 The hydraulic test bench system must be planned, located, sized, designed, and built with the following minimum requirements:

1.12.4.1 Must meet all applicable codes and standards.

1.12.4.2 Must be designed to support 202WD equipment test procedures as specified in Annex A-2 - Test Procedures.

1.12.4.3 Must be designed to provide the required pressure and flow to power test jigs and test equipment, as specified in Annex A-3 - Equipment List.

1.12.4.4 Dimensions must be such that the test equipment can fit on the test bench, as shown in Annex A-4 - Location of hydraulic test bench systems.

1.12.4.5 The data-acquisition system must record and log the required test data points.

1.12.4.6 Must have access to facilitate mechanical and electrical maintenance of the test bench systems.

1.12.4.7 Must be designed to perform continuous testing lasting up to 8 hours.

1.12.4.8 Must have safety functions for manual and automatic emergency stoppages.

1.12.4.8.1 The hydraulic test bench system must automatically shut down whenever the hydraulic fluid level is low.

1.12.4.8.2 Hydraulic test bench system controls must include a sensing system and controls to shut down the hydraulic system pump quickly in the event of a catastrophic hydraulic fluid leak or hydraulic test bench system failure.

1.12.4.8.3 The hydraulic test bench system must automatically shut down whenever the temperature of the hydraulic fluid in the tank exceeds the maximum allowable operating temperature or whenever the system pressure exceeds the operating limit.

1.12.5 The test bench, prime mover equipment, and associated piping must be completely self-supporting from the concrete floor slab, without being fixed to the wall.

1.13 VIBRATION INSULATION

1.13.1 The Contractor must provide vibration insulation for all motorized equipment with 1/2 HP motors or greater power as well as for piping and conduits. For equipment less than 1/2 HP, the Contractor must provide anti-vibration cable grommets at points of support.

1.13.2 The Contractor must submit shop drawings of all insulators.

1.13.2.1 Drawings must be stamped and signed by a professional engineer registered/licensed in the province of Québec in Canada.

1.13.2.2 Provide separate shop drawings for each insulated system, with performance and product data.

1.13.2.3 Provide detailed drawings of vibration control measurements for equipment and piping.

1.13.3 Insulators must be placed under the equipment to ensure that the minimum distance between adjacent corner insulators is at least equal to the height of the equipment's centre of gravity. Include the height of the centre of gravity on shop drawings. Otherwise, design with additional forces on supports and submit the design calculations with shop drawings for approval.

1.13.4 The Contractor must provide anti-wear pads at least 10 mm high under any insulated equipment. Anti-wear pads must be bonded to the structure and reinforced to meet Code seismic requirements.

1.13.5 The Contractor must provide flexible hoses and fittings between equipment and piping, as requested by manufacturers, to protect the equipment from stress and reduce vibrations in the piping system. The Contractor must adhere to the connector manufacturer's installation specifications as well as the equipment manufacturer's requirements. Hoses and connectors must be designed for the system's operating pressures and temperatures. The Contractor must provide flexible pipe fittings for all connections to equipment installed on the vibration insulators.

1.13.6 The Contractor must provide a flexible suspension loop of at least 180 degrees for all electrical connections to insulated equipment.

1.13.7 Inspections:

1.13.7.1 The Contractor must inspect the entire installation following system start-up and establish that the insulators for each piece of equipment are properly installed and adjusted. The Contractor must correct all instances of poor performance.

1.13.7.2 The Contractor must submit a statutory declaration to the 202WD representative indicating that vibration insulation has been installed in accordance with drawings and instructions and is functioning satisfactorily.

1.14 SEISMIC RESTRAINT

1.14.1 The Contractor must arrange and pay for the services of a professional structural engineer licensed in the province of Québec. This structural engineer, hereinafter referred to as a seismic engineer, must provide all required engineering services relating to the seismic constraints of equipment, accessories, and industrial, mechanical and electrical services, including all fixings on the equipment and structure. The Contractor must submit a letter of design assurance and professional engagement for field review of seismic restraint installation prior to the start of construction activities and submission of shop drawings as well a letter of assurance for onsite review at the end of the project.

1.14.2 The seismic engineer must inspect the completed seismic installation and submit a letter of in accordance with according to the drawings and that it complies with regulatory requirements, codes, and standards.

1.14.3 The Contractor must supply and install all equipment relating to seismic constraints (including bolts and anchors) from the point of attachment to the equipment through the attachment to the ground.

1.14.4 It is the sole responsibility of the Contractor to design its equipment such that the strength and anchoring of the equipment's internal components exceeds the level of force used to hold and anchor the device itself to the support structure.

1.14.5 Shop drawings: the Contractor must submit drawings stamped and signed by a professional engineer chartered in the province of Québec in Canada. Note that shop drawings must be specific to this project, with a reference and drawings showing the attachment to the structure.

1.14.6 The Contractor must submit design data, including:

1.14.6.1 Full details of design criteria.

1.14.6.2 Working drawings, lists of materials, diagrams, and complete component specifications for each seismic restraint system.

1.14.6.3 Design calculations (including stress loads resulting from seismic forces in accordance with the National Building Code, detailed worksheets, and tables).

1.14.6.4 Separate shop drawings for each seismic restraint system and devices for each equipment system.

1.14.6.5 Identifying locations for devices.

1.14.6.6 Planning types of equipment and seismic restraint system devices.

-
- 1.14.6.7** Details of structural attachments, anchoring loads, and attachment methods.
 - 1.14.6.8** Installation procedures and instructions.

2.0 PRODUCTS

2.1 DESIGN CRITERIA

2.1.1 The design criteria provided below are minimum requirements. If there is a conflict between the criteria stated below, those indicated in the applicable codes and standards and those necessary for testing the equipment, as indicated in Annex A-3 - List of Equipment, the more stringent criteria shall prevail.

2.1.2 The test bench must be specific to the following type of oil: MIL-H 6083.

2.1.3 The design of the hydraulic test bench system must accommodate the size, weight and flow rate of the test equipment as detailed in Annex A-3 - Equipment List. A dedicated bench for linear actuators is not required. Hydraulic equipment for universal testing of linear actuators and servovalves must be supplied directly from the hydraulic test bench.

2.1.4 Operating pressure, flow, and temperatures:

2.1.4.1 The maximum supplied flow from the main power supply must be at least 250 litres per minute at 230 bar.

2.1.4.2 The maximum supplied pressure from the main power supply must be at least 410 bar at 90 litres per minute.

2.1.4.3 Setting adjustments for flow and pressure must be independent of each other.

2.1.4.4 The available working pressure must vary from 0 to at least 410 bar with a rate of change of at least 35 bar per second.

2.1.4.5 The available working flow must vary from 0 to at least 250 litres per minute with a variation rate of at least (5 litres per minute) per second.

2.1.4.6 All components must withstand in-service pressure of at least 410 bar.

2.1.4.7 All components required for static pressure testing must withstand a pressure of at least 1,380 bar.

2.1.4.8 The temperature of the working fluid during test procedures must be between at least 35°C and at most 70°C.

2.1.4.9 The hydraulic test bench must use central hydraulic pumps and booster pumps designed to provide the nominal flow rates and pressures indicated for the test equipment - see Appendix A-3 - Equipment List.

2.1.5 Bench layout and sections:

2.1.5.1 The front of the test bench must have three parts:

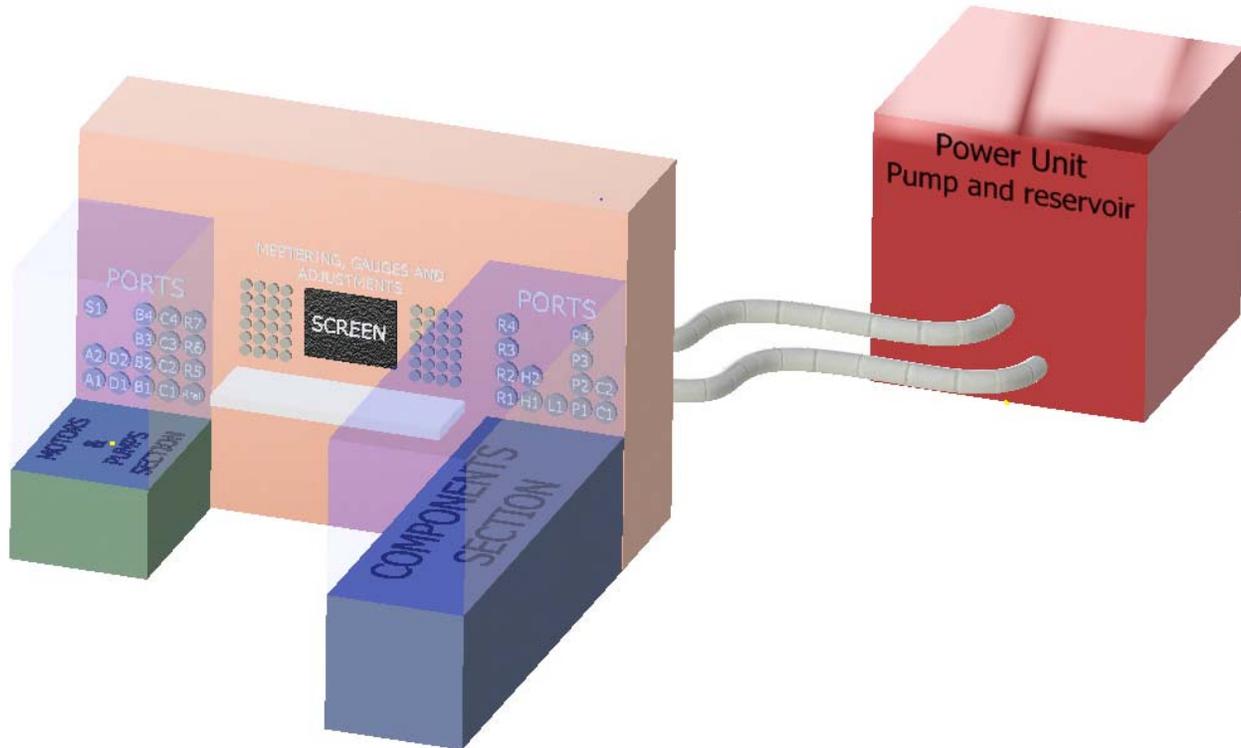
2.1.5.1.1 On one side, there must be a working area to test the various hydraulic components (all types of valves, cylinders, pistons, accumulators, etc.). This area must include a worktable ten (10) feet long by three (3) feet wide, with the work surface at three (3) feet high and connections as per Article 2.1.9 of this Annex.

2.1.5.1.2 The control panel must be located in the centre with all the settings and dials.

2.1.5.1.3 On the other side, there must be a working area to test pumps and motors. This area must consist of a worktable four (4) feet long by three (3) feet wide, with the work surface at two (2) feet high and connections as per Article 2.1.9 of this Annex.

2.1.5.2 The capacity of each worktable must be at least 500 lb applied to an area of one square foot in the centre of the worktable.

2.1.5.3 Representation and proposal for bench sections:



2.1.6 Main motor equipment (prime mover):

2.1.6.1 Bench fluid supply must come from the hydraulic unit installed in the same room as the main motor (prime mover), which must be soundproofed.

2.1.6.2 The main motor's hydraulic equipment must have:

2.1.6.2.1 Two main functions: supply the test bench with fluid at the desired pressure; store and condition the fluid to ensure long system life.

2.1.6.2.2 Removable accessibility panels allow easy and quick access to components for maintenance.

2.1.6.2.3 Noise level "outside" of the cabinet of at most 80 dB at 1 metre.

2.1.6.3 The motor/pump coupling must be made of steel and require no maintenance.

2.1.7 Test jigs and work surface:

2.1.7.1 The bench must include a dedicated vertical universal test jig for pumps and motors.

2.1.7.1.1 Speed range: 0 to 4,000 rpm (minimum). Higher revs are acceptable.

2.1.7.1.2 Power range: 0-75 HP.

2.1.7.2 Each work surface of the bench must include a horizontal test jig for mounting the valve blocks.

2.1.7.3 Test jigs must be universal and designed to test different pumps (submersible, non-submersible) and motors, which must be tested in compliance with the standards of the Society of Automotive Engineers (SAE) and the Deutsches Institut für Normung (DIN).

2.1.7.4 Universal test templates must allow rapid passage between items to be tested.

2.1.7.5 Both worktables must:

2.1.7.5.1 Be designed to prevent oil spills from the test bench in the event of an incident.

2.1.7.5.2 Reduce all risk of injury.

2.1.7.5.3 Worktables must be equipped with a safety cage that can be closed during testing and meet the following requirements:

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- 2.1.9.1.2.3** Four (4) casing drain return ports, at least two of which have a flow meter. Flow per port: range of 0.1 to 15 L/min (identified as C1, C2, C3 and C4). There must be a restriction limiting the flow to 15 L/min at most.
- 2.1.9.1.2.4** Four (4) pilot pressure supply ports with separate pressure regulators (identified as B1, B2, B3 and B4).
- 2.1.9.1.2.5** A port for testing submersible pumps identified as S1. The pump must remain submerged at 233 L/min. The dimensions of the bell are 16 inches in diameter by 16 inches long.
- 2.1.9.1.2.6** Four (4) return ports (identified as Rra1, R5, R6 and R7):
- 2.1.9.1.2.6.1** The bench must have an adjustable pressure relief valve identified as Rra1 (adjustable restriction) equipped with a flow meter; this valve must measure pressure.
 - 2.1.9.1.2.6.2** One (1) port directed to a flow meter and equipped with a visual flow indicator (R5).
 - 2.1.9.1.2.6.3**
Two (2) ports directed straight to the tank (R6 and R7).
- 2.1.9.1.3** The control system must keep the parameters (pressure and flow) stable over time, allowing, among other things, to adjust the parameters automatically if the viscosity of the oil changes during the test.
- 2.1.9.1.4** Even if the operator varies a parameter during a test, the others must be able to remain constant (a variation of maximum 1% of the value of the parameter is authorized) when activating the command.
- 2.1.9.2** The outlets must be flush face, drybreak, quick connect/disconnect, and non-spill.
- 2.1.10** Cycle:
- 2.1.10.1** The stand must have two (2) pressure outlets identified as C1 and C2.
 - 2.1.10.2** Outlets must be controlled by a timer that is activated when pressure is applied. Whenever the cyclical mode is selected, the connections must alternate between outlet and automatic return (whenever C1 is set to outlet and C2 to return and inversely).
 - 2.1.10.3** An output indicator must light up whenever outputs C1 and/or C2 are pressurized.
 - 2.1.10.4** The bench must have a cycle meter (pressure and depressurization of the 2 cycle outputs).
 - 2.1.10.5** These two outputs must be able to be used at the operator's choice by turning a knob (use C1 or C2 only (independently) or both simultaneously).
- 2.1.11** Test bench housing:
- 2.1.11.1** Housing must be fully welded at least 14 gauge, stainless steel construction, with brushed finish.
 - 2.1.11.2** The support frame must be welded stainless steel.
- 2.1.12** Safety:
- 2.1.12.1** Emergency stop push-buttons. The test bench must have two emergency stop buttons.
 - 2.1.12.1.1** One labelled "Stop bench" must close the high-pressure inlet valve to the test bench, thereby stopping the pump or motor during testing.
 - 2.1.12.1.2** One labelled "Emergency stop" must stop all the pumps of the hydraulic unit serving the bench.
 - 2.1.12.1.3** The test must be ended and resumed before the main feed pumps can restart.
 - 2.1.12.2** Alarms:
The control console must have at least the following failure alarms:
 - 2.1.12.2.1** Low pressure at the pump.
 - 2.1.12.2.2** Low level in tank.
 - 2.1.12.2.3** High hydraulic fluid temperature.
 - 2.1.12.2.4** High differential pressure at the filter.
- 2.1.13** Electrical:
- 2.1.13.1** The main power source for the installation must be three-phase 600 V. This source and grounding are provided by the base building.

2.1.13.2 The 100A 120/208 V three-phase distribution panel located in the installation is supplied by the base building. The Contractor must provide branch circuit breakers for all installations.

2.1.13.3 Electrical outlets for test equipment:

2.1.13.3.1 The Contractor must supply three standard 110 V 20A duplex sockets on the bench: one at each end and one on the front panel.

2.1.13.3.2 The Contractor must provide an adjustable 0-26 V DC power supply to control the testing equipment.

2.1.13.4 The electrical installation must allow the current (mA) and voltage (mV) to be adjusted for the servovalve test;

2.1.13.5 The work surface and various dials must be illuminated.

2.2 HYDRAULIC FLUID TANK

2.2.1 The tank must have adequate capacity and design to ensure that it does not empty during prolonged operation (8 hours of continuous use) at 100% of the capacity of the test bench. Capacity must be at least 1.5 times the maximum system flow rate to ensure adequate oil cooling.

2.2.2 The storage tank must be made of stainless steel 316 welded for corrosion-prevention.

2.2.2.1 The Contractor must provide a double-walled tank for secondary containment of oils.

2.2.2.2 The Contractor must ensure the detection of leaks in the interstitial space of the tank, connected to the monitoring control panel, which must be CSA-certified (Canadian Standards Association).

2.2.2.3 The local leak detection alarm must also be wired into the PLC programmable control system.

2.2.3 The Contractor must provide a sight glass in the hydraulic tank to enable visual inspection of the oil level. It must cover at least 50% of the tank's height and be visible from outside the motor unit.

2.2.4 The Contractor must provide a float switch to monitor the liquid level continuously and provide a warning or signal to shut down the system depending on conditions.

2.2.5 The Contractor must include pressure gauges mounted on the tank panel to show system pressure.

2.2.6 The Contractor must provide an access panel to the tank. The panel must be bolted to the tank and sized for cleaning the tank's inner surfaces.

2.2.7 The tank must be designed to minimize the collection of residue. Must include means to remove residue periodically.

2.2.8 The tank must have a plug (drain plug) to drain the oil completely.

2.2.9 The tank must have baffles to move the oil within the tank.

2.2.10 The tank must be designed so that the associated pump is always saturated with oil.

2.2.11 The air inlet must be located at one end at the bottom of the unit and filtered to prevent dust from entering.

2.2.12 The geometrical shape of the air outlet must prevent dust from entering the interior while being on top of the unit at the opposite end of the air inlet.

2.2.13 The geometrical shape of the cabinet must ensure good air circulation around the main tank.

2.2.14 Drip tray under the worktables:

2.2.14.1 A perforated plate must cover the oil recovery tank (under the worktables). The plate is not permanently attached to the frame, thereby enabling easy removal. It must have a screen between 75 and 125 μm to prevent any debris in the tank from entering the piping leading to the pump and motor.

2.2.14.2 The holding tank must be designed to drain all residual oil into an auxiliary tank with a capacity of 20 to 30 L equipped with a transfer pump with controlled level activation.

2.2.14.3 The recovered oil must pass through a 3-micron filter and is returned to the main tank.

2.2.14.4 The recovery tank must cover the entire surface of the hydraulic components and not just the parts to be tested.

2.3 HYDRAULIC PUMPS

2.3.1 Main pumps:

2.3.1.1 Pumps must be designed to provide the nominal flow rates and pressures indicated for the test equipment - see Annex A-3 - Equipment List.

2.3.1.2 Flow rates and pressures must be provided by one or more pumps.

2.3.2 Variable frequency drives:

2.3.2.1 There must be a variable frequency drive for each pump so that all high/low pressures and flows and required combinations can be achieved.

2.3.2.2 These drives must also provide reduced voltage acceleration of large motors.

2.3.3 The booster pump must be able to supply boost pressure up to 1,380 bar for static tests. The stand must be able to test hydrostatic transmissions.

2.3.4 The electronic control system provided by the Contractor must be able to perform this function: build up the pressure gradually to avoid water hammer.

2.4 CONTROL OF THE HYDRAULIC AND DATA-ACQUISITION SYSTEM

2.4.1 The test bench must be equipped with a programmable logic controller (PLC) system and PC-compatible console that must include control and data-acquisition software enabling at least the following functions:

2.4.1.1 Conduct automated test programs (data to be entered by users).

2.4.1.2 Provide frequency of sampling of programmable data on the basis of the type and duration of testing (the frequency must be defined by users). Manually adjust all system-testing flows and pressures prior to and during the test.

2.4.1.3 Save data readings from all meters and gauges during testing.

2.4.1.4 Monitor and consult data readings from previous tests to compare performance results.

2.4.1.5 Consult the manufacturer's testing data to compare performance results (data must be entered by users).

2.4.1.6 Calculate test results (efficacy, losses, etc.)

2.4.1.7 Print test results in a report format (format may be personalized by users).

2.4.1.7.1 The system must be able to supply digital and graphical results in the report.

2.4.2 Each function described above must be linked to the serial number of each test equipment so that records of its performance can be kept throughout the life of the test equipment.

2.4.3 The Contractor must provide one (1) computer system with touch-screen interface for the test bench.

2.4.3.1 The computer system must have auxiliary keyboard and mouse input devices (no Bluetooth/wireless allowed).

2.4.3.2 The computer system must include 30 minutes of backup power and a 120 VAC power source from the facility's control panel.

2.4.3.3 The computer system supplied must be on a platform compatible with Windows 10 - 64 Bits.

2.4.3.4 If there is a DBMS (Database Management System), SQL or Oracle must be used and provided with a data backup mechanism.

2.4.3.5 Must have an authentication mechanism giving access to the computer system.

2.4.3.6 If there are servers, they must be in a Windows Servers 2016 environment.

2.4.3.7 Must have two (2) USB ports to connect and download the contents of the data-acquisition system.

2.4.3.8 Must provide an Ethernet port to allow connection to the network.

2.4.4 The control panel and the mechanical valves must be located outside the safety cage.

2.4.5 Must include a printer connected to the system to print data and reports.

2.4.6 Before starting the detailed design, the Contractor must confirm the operational requirements with the 202WD representative.

2.4.7 Operator control:

2.4.7.1 The system must be able to perform manual and automated tests.

2.4.7.2 Automated tests must not require any operator intervention.

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- 2.4.7.3** Each controller on the test bench must be clearly identified.
 - 2.4.7.4** The PLC must take the variables entered by the operator and perform the complete test automatically.
 - 2.4.7.5** In manual mode, the operator must be able to control the testing process by manually adjusting the following parameters using the control devices located on the console:
 - 2.4.7.5.1** Flow
 - 2.4.7.5.2** Speed
 - 2.4.7.5.3** Pressure
 - 2.4.7.5.4** Boost pressure
 - 2.4.7.5.5** Pilot pressure
 - 2.4.8** The graphic display must:
 - 2.4.8.1** Provide a colour graphical display of the test configuration as entered by the operator.
 - 2.4.8.2** Indicate all equipment, piping, valves, and various related components.
 - 2.4.8.3** Must be dynamic and clearly indicate when valves are open or closed, pumps on or off, etc.
 - 2.4.8.4** Indicate "red" valves when they are closed and "green" when open.
 - 2.4.8.5** Indicate all pressures and temperatures.
 - 2.4.8.6** Indicate tank level controls.
 - 2.4.8.7** Indicate all alarms.
 - 2.4.8.8** The screen must include measurement sensors built into the test bench that calibrate automatically.
 - 2.4.8.9** The digital display must offer a minimum precision equal to that of mechanical dials.
 - 2.4.8.10** The display of numerical parameters and their units is at the discretion of the operator.
 - 2.4.9** Display and measurement acquisition:
 - 2.4.9.1** Each value must be read directly on the test bench with mechanical dials and/or displayed digitally.
 - 2.4.9.2** Pressure measurements:
 - 2.4.9.2.1** Each connection must be equipped with a pressure gauge with graduation:
 - 2.4.9.2.1.1** 0.1 bar for values of 0 to 16 bar.
 - 2.4.9.2.1.2** 0.5 bar for values of 0 to 100 bar.
 - 2.4.9.2.1.3** 2 bar for values of 0 to 420 bar.
 - 2.4.9.2.1.4** 5 bars for values of 0 to 1,380 bars (static pressure).
 - 2.4.9.2.2** Pressure measurements must be accurate to $\pm 0.25\%$ of the functional range set by the American Society of Mechanical Engineers (ASME) B40.100 Grade 3A.
 - 2.4.9.2.3** Each indicator must have a "test point" to verify its acuity during a calibration.
 - 2.4.9.2.4** Each indicator must have surge protection.
 - 2.4.9.2.5** Each indicator must have an isolation valve.
 - 2.4.9.2.6** 3 electronic external pressure probe connections must be connected to the data-acquisition system built into the test bench and they must be compatible with Parker ServiceMaster (catalogue 4054-1/EN page 16).
 - 2.4.9.3** Torque measurements must have:
 - 2.4.9.3.1** Measuring range of 0 to 500 N-m.
 - 2.4.9.3.2** Measurement accuracy of $\pm 0.1\%$.
 - 2.4.9.4** Flow measurement (flow meters):
 - 2.4.9.4.1** Gear-type flow meters must be used (volumetric gear flow meter).
 - 2.4.9.4.2** The bench must have two (2) flow meters (one flow meter from 0 to 12 L/min with an accuracy of 0.01 L/min and a second from 0 to 250 L/min with an accuracy of 0.1 L/min).
 - 2.4.9.4.3** The flow meters must be protected by fixed restrictions against excessively high flow rates and by a button that allows switching from one flow meter to another.
 - 2.4.9.5** Measurements in revolutions per minute:
 - 2.4.9.5.1** Sensors must have at least 1,024 pulse per revolution.

- 2.4.9.5.2** The resolution of the sensors must be 0.1 rpm or lower.
- 2.4.9.5.3** Must be able to measure a maximum rotational speed of at least 4,000 rpm.
- 2.4.9.6** Power measurements:
 - 2.4.9.6.1** The operating range must be between 0 and 100 kW.
 - 2.4.9.6.2** Measurement accuracy must be $\pm 0.1\%$.
- 2.4.9.7** Vacuum measurements:
 - 2.4.9.7.1** Measurement accuracy must be 5 mmHg or less.
 - 2.4.9.7.2** The operating range must be from 0 to 760 mmHg.
- 2.4.9.8** Electrical measurements:
 - 2.4.9.8.1** The bench must provide display in mV, mA, and μA .
 - 2.4.9.8.2** Measurement accuracy must be at least ± 0.1 mV-mA.

2.5 PIPING, FITTINGS AND VALVES FOR HYDRAULIC SYSTEM

- 2.5.1** Piping, fittings, and valves must be designed for an operating pressure of at least 41 MPa (6,000 PSI).
- 2.5.2** Piping:
 - 2.5.2.1** Hydraulic lines must be made of rigid metal lines (stainless steel) of the "seamless" type with a safety factor of at least 4.
 - 2.5.2.2** Piping in compliance with ASTM A182 (American Society for Testing and Materials).
 - 2.5.2.3** Fittings in compliance with ANSI B16.11 (American National Standards Institute).
 - 2.5.2.4** Must allow pipe expansion.
- 2.5.3** All valves must have a CRN (Canadian Registration Number).
- 2.5.4** Pressure gauges:
 - 2.5.4.1** Pressure gauges must be designed for system pressure and certified for use in hydraulic systems.
 - 2.5.4.2** Must have a shut-off valve for each gauge installation.
- 2.5.5** Thermometers must be designed for system pressure and certified for use in a hydraulic system.
- 2.5.6** Flexible hose connections must be designed for the system pressure at each pump inlet/outlet; connections to the test bench and all other locations must be connected to dampen vibration.
- 2.5.7** Pipe insulation (as appropriate):
 - 2.5.7.1** Insulation as follows:
 - 2.5.7.1.1** Fire and smoke estimate in compliance with CAN/ULC-S102*
* Underwriters' Laboratories of Canada (ULC)
 - 2.5.7.1.2** Mineral fibres: Mineral fibre in compliance with standard ASTM C553; Jacket in compliance with standard CGSB 51-GP-52Ma (Canadian General Standards Board); Maximum K-factor in compliance with standard ASTM C553.
 - 2.5.7.2** Canvas jacket in compliance with standard ASTM C921.
 - 2.5.7.2.1** All components requiring maintenance must have removable insulating sleeves.
 - 2.5.7.2.2** All exterior piping must have a waterproof aluminum coating.
- 2.5.8** The Contractor must seal all points of penetration in the walls.
- 2.5.9** The quick connectors for the hydraulic outlets/returns must be zero-leakage and unrestricted. For normal connections, the model must withstand at least 410 bar (static); for high-pressure connections, the model must withstand 1,380 bars (static).
- 2.5.10** Two (2) "quick connect" compressed air outlets must be installed at the front of the bench, one on each side and outside the safety cage. Compressed air is supplied by our organization.

2.6 HYDRAULIC FLUID FILTRATION SYSTEM

- 2.6.1** The system must have a built-in loop filter to keep the fluid clean (kidney loop filter). Circulate the hydraulic fluid constantly in the tanks and pipes. To achieve an ISO cleanliness code below or equal to 13/11/8 per ISO 4406:2017, the oil must be filtered. The system must not be calibrated more than once a year.

2.6.2 Filtering system components must be monitored and controlled from the PLC control system. The hydraulic fluid filtration system must:

2.6.2.1 Automatically start liquid circulation every morning.

2.6.2.2 Pass the fluid through two filters in series.

2.6.2.3 Also pass return oil from test benches in a separate double-filter system.

2.6.2.4 A flushing system.

2.6.2.5 Include a filter light on the gauge panel for activation when the filter pressure drop is high.

2.6.2.6 A light must be able to indicate a blockage in a filter and identify the filter involved.

2.6.2.7 The oil's ISO cleanliness code must be displayed in real time.

2.6.3 At higher pressures, the oil must bypass the filter and return directly to the tank.

2.6.4 The hydraulic fluid filtration system must have at least the following filtration stations: one (1) off-line; one (1) on the pressurized circuit, one (1) on the return line; and (1) on the oil inlet from the main tank.

2.6.5 The hydraulic fluid filtration system must have pressure gauges at all filters.

2.6.6 There must be a hygroscopic breather at the tank inlet.

2.6.7 The water's contamination level must always be below the saturation point of MIL-H-6083 at 45°C. Contamination must be measured in real time by two independent systems and the gauges must be visible to operators at all times.

2.7 HYDRAULIC FLUID COOLING SYSTEM

2.7.1 The Contractor must supply a cooling system for hydraulic systems to maintain the temperature of the hydraulic fluid within a consistent range.

2.7.2 Minimum scope of work includes:

2.7.2.1 Maintain the operating temperature of the fluid during the test procedures between at least 35°C and at most 75°C.

2.7.2.2 The control system must be able to control all temperatures within this range up to ±5°C.

2.7.3 If the fluid cooler is designed for outdoor installation, provide freeze protection, including pipe insulation, heat tracing, a 120 VAC power source, and connection.

2.7.4 The resulting heat must be released outside the main building.

2.7.5 Must comply with Canadian standards with respect to the environment and machine safety (Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST)).

2.7.6 The system must remain at ground level.

2.7.7 Cooling distribution:

2.7.7.1 Thermometers:

2.7.7.1.1 The Contractor must supply thermometers at the following locations: inlet and outlet oil piping at the heat exchangers; hydraulic fluid tanks; and test bench entry and exit.

2.7.7.1.2 Must be compliant with CGSB 14.4 - M88 (Canadian General Standards Board).

2.7.7.2 Cooling system checks:

2.7.7.2.1 Must monitor and control through the main hydraulic control system.

2.7.7.2.2 Must monitor hydraulic fluid temperature at control panels.

2.8 HYDRAULIC FLUID HEATING SYSTEM

2.8.1 Hydraulic oil operating temperatures:

2.8.1.1 The hydraulic fluid heating system must maintain the operating temperature of the fluid during the test procedures between at least 35°C and at most 75°C.

2.8.1.2 The control system must be able to control all temperatures within this range up to ±5°C.

2.8.2 The heating system must be connected in series with filters and installed on the same supports as the filters.

- 2.8.3** Heaters must be industrial grade in-line electric heaters certified for hydraulic fluids.
- 2.8.4** The heating system must provide automatic modulation of the regulating heaters from the PLC control system, with additional monitoring through the remote control system.
- 2.8.5** The heating system must be equipped with local temperature sensors that provide readings.

2.9 HYDRAULIC COOLING/HEATING SYSTEM CONTROL PANEL

- 2.9.1** The Contractor must supply a separate panel to monitor and indicate the operation of the cooling/heating system components for each of the hydraulic fluids. As part of its minimum functions, it must have:
 - 2.9.1.1** A separate indicator for "no flow" condition in each circuit.
 - 2.9.1.2** Circulation pump indicator lights: green when operating and red when off.
 - 2.9.1.3** Indicator lights for heater operation: green when in use and red when off.
 - 2.9.1.4** Pump controls: Off-Auto-Manual-Timer.
 - 2.9.1.5** A high-temperature audible alarm.
- 2.9.2** All signals must also be monitored on the electronic control system, and triggered whenever necessary.

2.10 MOTORS

- 2.10.1** All motors must be designed with National Electrical Manufacturers Association (NEMA) Premium efficiency in compliance with NEMA MG1-2014 and must have minimum and rated full-load efficiency in compliance with test procedure IEEE 112-B method (Institute of Electrical and Electronics Engineers).
- 2.10.2** Motors controlled by variable frequency drives must be designed for use with variable frequency drives.
- 2.10.3** Motors must be designed for a duty factor of 1.15 in an environment of 40°C.
- 2.10.4** All motors must be standard at 1,800 RPM, unless otherwise specified.

2.11 ELECTRICAL PRODUCTS

- 2.11.1** Major electrical components must include the following:
 - 2.11.1.1** 600V AC motor control centre, including VFD (variable frequency drive) and power quality analysis monitor, etc.
 - 2.11.1.2** All required controls, including hardware, software, and communication devices.
 - 2.11.1.3** AC line and load reactors.
 - 2.11.1.4** Manually operated switches and installations, including voltage and current adjustment.
 - 2.11.1.5** Digital metering with network interface accessories.
- 2.11.2** Motor control centre (MCC)
 - 2.11.2.1** The MCC must meet or exceed the requirements of the following standards for MCC.
 - 2.11.2.1.1** NEMA ICS 18 - Industrial Products and Systems: MCC.
 - 2.11.2.1.2** UL 845 - UL standard for MCC safety.
 - 2.11.2.1.3** Canadian Standards Association (CSA) C22.2 No. 254-05.
 - 2.11.2.1.4** IEEE C37.20.7-2007: IEEE Guide for Testing Medium-Voltage Metal-Enclosed Switchgear for Internal Arcing Faults.
 - 2.11.2.2** Minimal requirements:
 - 2.11.2.2.1** 600 V, 60 Hz, Wye connection, 3-phase, 3-wire, grounded.
 - 2.11.2.2.2** Designed for category 2 or lower electric arcs.
 - 2.11.2.2.3** CSA 1 or indoor waterproof enclosure, front mounting.
 - 2.11.2.2.4** NEMA Class I, Type C wiring.
 - 2.11.2.2.5** NEMA 2 enclosure complete with drip guard.
 - 2.11.2.2.6** Outgoing cables must be able to exit from the top or bottom with terminals.
 - 2.11.2.2.7** Both ends of the motor control centre must be expandable, including bus bars, without drilling, cutting or further field preparation.
 - 2.11.2.3** Distribution panels in compliance with CSA-C22.2 No. 29.

2.11.2.4 Cables and wiring:

2.11.2.4.1 Power Wiring: stranded conductors for 10 AWG and larger. Minimum size: 12 AWG.

2.11.2.4.2 Variable frequency drive (VFD) cables:

2.11.2.4.2.1 Cables must be 1000V, specifically designed for variable frequency drives and VFD application. Install the conductors on the load side of the VFD to the motor.

2.11.2.4.2.2 The insulation must be designed for a wet/dry operating temperature of 90°C.

2.11.2.4.2.3 The cable must be suitable for use in wet/dry locations, indoors and outdoors.

2.11.2.4.2.4 The conductor must be compliant with standards ASTM B3, B8 and B33.

2.11.2.4.2.5 The insulating materials must be compliant with UL 44.

2.11.2.4.3 Motor pilots:

2.11.2.4.3.1 Mounting of the variable frequency drive (VFD) in the MCCs. Motor pilots must meet the following requirements:

2.11.2.4.3.1.1 CSA approval from the factory.

2.11.2.4.3.1.2 Constant DC voltage bus type.

2.11.2.4.3.1.3 Voltage: 600 V, three-phase.

2.11.2.4.3.1.4 Minimum end-to-end efficiency of 0.97 over the entire motor speed range.

2.11.2.4.3.1.5 Input voltage tolerances of +10% and -20%.

2.11.2.4.3.1.6 Pulse with modulated control (phase angle control not permitted).

2.11.2.4.3.1.7 Short-circuit protection for line-to-line or line-to-earth faults.

2.11.2.4.3.1.8 Soft start function, automatic restart after power failure.

2.11.2.4.3.1.9 Speed adjustment from zero to maximum without "cogging" or other fluctuations or instabilities.

2.11.2.4.3.1.10 Bypass features must include the following:

2.11.2.4.3.1.10.1 Manual bypass to transfer the motor from the VFD to the power line or from the line to the controller when the motor is at zero speed.

2.11.2.4.3.1.10.2 The frequency converter must include mechanical and electrical interlocking isolation and bypass contactors with thermal relay, VFD/CLOSED/ BYPASS switch and TEST/NORMAL selector.

2.11.2.4.3.1.10.3 Motor overload protection must be provided in controller mode and bypass mode.

2.11.2.4.3.1.10.4 The operator must have full control of the bypass starter by operating the EFV/CLOSED/BYPASS selector.

2.11.2.4.3.1.10.5 A TEST/NORMAL selector must be used to test the operation of the current converter while the motor is operating in bypass.

2.11.2.4.3.1.10.6 A pilot light must indicate whether the motor is running in drive mode or bypass mode.

2.11.2.4.3.2 Status indication for the following situations:

2.11.2.4.3.2.1 DC power supply.

2.11.2.4.3.2.2 Time current overload.

2.11.2.4.3.2.3 Remote shutdown.

2.11.2.4.3.2.4 External overheating.

2.11.2.4.3.2.5 Overload.

2.11.2.4.3.2.6 Ground-fault shutdown.

2.11.2.4.3.2.7 Control logic circuit malfunction.

2.11.2.4.3.2.8 Line overvoltage.

- 2.11.2.4.3.2.9** Live line.
- 2.11.2.4.3.3** Permissible overload rate of 110% for 1 minute.
- 2.11.2.4.3.4** Linear acceleration and deceleration separately adjustable from 0.5 to 25 seconds.
- 2.11.2.4.3.5** Anti-regeneration replacement to prevent nuisance tripping during deceleration.
- 2.11.2.4.3.6** Adjustable minimum (0 to 50%) and maximum speed (50 to 100%).
- 2.11.2.4.3.7** Slip compensation.
- 2.11.2.4.3.8** Adjustable IR compensation to provide high starting torque.
- 2.11.2.4.3.9** Setting / Adjusting the maximum frequency.
- 2.11.2.4.3.10** Setting / Adjusting the frequency range.
- 2.11.2.4.3.11** Setting/ Adjusting the output voltage.
- 2.11.2.4.3.12** Internal/external controls for each function above.
- 2.11.2.4.3.13** Load bypass switch to allow the motor to continue running in the event of an inverter failure or repair.
- 2.11.2.4.3.14** The following items must be mounted on the door:
 - 2.11.2.4.3.14.1** Run and Stop push buttons or switches.
 - 2.11.2.4.3.14.2** Manual-Off-Auto selector.
 - 2.11.2.4.3.14.3** Manual speed adjustment potentiometer.
 - 2.11.2.4.3.14.4** Speedometer indicating 0 to 100%.
- 2.11.2.4.3.15** Must include one in-line reactor and one under-load reactor, sized to match that of the motor.
- 2.11.2.4.3.16** Quality controls:
 - 2.11.2.4.3.16.1** Must comply with the most recent standards issued by IEEE, ANSI, and CEC (Canadian Electrical Code).
 - 2.11.2.4.3.16.2** Must be tested in compliance with standards ANSI/UL 508 and listed by ULC (Underwriters Laboratories of Canada) and ETL (Electrical Testing Laboratories).

3.0 Execution

3.1 MECHANICAL EQUIPMENT AND SYSTEM INSTALLATION

- 3.1.1** All on-site mechanical installations and connections must be carried out by workers qualified and accredited to work in the province of Québec.
- 3.1.2** Tanks, pumps, and other important equipment must be installed on concrete supports.
- 3.1.3** The Contractor must include elastic supports to absorb the reaction forces of the high-pressure piping.
- 3.1.4** The Contractor must design and install the piping to allow its expansion and contraction.
- 3.1.5** The Contractor must include pressure-relief valves, compliant with code requirements, to relieve system pressure due to equipment malfunction. Discharge pipe from the valve to a sump or other safe location.
- 3.1.6** The Contractor must supply shut-off valves to allow maintenance of each piece of equipment and system components.
- 3.1.7** The Contractor must supply a shut-off valve at each pump inlet to isolate them from the tanks.
 - 3.1.7.1** Must monitor the open status of these valves via limit switches to ensure the valve is fully open before a pump can operate.
 - 3.1.7.2** Closing a valve while the pump is operating must cause it to stop immediately.
- 3.1.8** The Contractor must supply check valves to prevent backflow of liquid into the system piping that is not part of the test procedure.
- 3.1.9** The Contractor must supply pressure gauges for all filters and equipment wherever pressure monitoring is part of process verification.

3.1.10 The Contractor must supply thermometers at the following locations: inlet and outlet of heat exchangers, fluid cooler, oil tanks, etc.

3.1.11 Two (2) oil samples for analysis and their accessories must be present (one in the recirculation loop and one on the test bench).

3.2 CONNECTION TO BUILDING SERVICES

3.2.1 The Contractor must establish the final connection with building services during installation of the equipment.

3.2.2 The Contractor must provide adequate space between the equipment and building services to facilitate connection.

3.2.3 Connections to buildings must be made in the presence of a DND electrician.

3.3 WORK BY OTHERS (SUBCONTRACTORS)

The Contractor must coordinate the work with the construction manager and other contractors on site. If any part of the work under this contract depends on its proper performance or on the results of the work of another contractor, the Contractor must promptly notify the 202WD representative in writing. All staff who must enter the base must have security clearance before starting work (possible 3-month wait period). Additional documentation must be completed by the contractor for companies, installers and sub-contractors who are to come to the DND site.

3.4 ELECTRICAL INSTALLATION

3.4.1 All electrical installations and connections on site must be carried out by a certified electrician registered in Québec.

3.4.2 Motors, control and distribution devices, and equipment must operate at 60 Hz within the normal operating limits established by CAN3-C235-83 (R2015).

3.4.3 Coordination study of protection devices and electric arc study.

3.4.3.1 Prior to testing and commissioning, the Contractor must verify and calibrate the circuit protection devices according to the required values and parameters and submit the commissioning report signed and sealed by a licensed engineer in the province of Québec.

3.4.3.2 The Contractor must conduct an arc flash hazard study for all distribution systems, including product data for device equipment, panels, and all associated 600V, 208V and 120V protections, in accordance with section 2-306 of the CEC.

3.4.3.3 The Contractor must provide an appropriate arc flash warning sticker for each electrical component.

3.4.4 Duct installation:

3.4.4.1 The Contractor must use rainproof connectors and couplings to access electrical components.

3.4.4.2 All ducts must be surface-mounted and be parallel or perpendicular to building lines.

3.4.4.3 The Contractor must not place pipes less than 75 mm parallel to the steam or hot water pipes with a minimum of 25 mm at the intersection.

3.4.4.4 Horizontal laying of a surface duct is not authorized at low altitude.

3.4.4.5 The Contractor must supply a liquid-tight duct and connectors for connection to the motor.

3.4.4.6 The filling of the duct must not exceed 40%.

3.4.4.7 Maximum duct curvature is limited to four (4) 90 degrees.

3.4.4.8 For ductwork passing through walls, partitions, ceilings, and floors, the space between the sleeves and duct must be filled with a ULC-listed firestop and caulked at the top and bottom with a resilient, flammable and weather-resistant silicone base compound.

3.4.5 Contact between dissimilar metals, such as copper and aluminum, is not allowed.

3.4.6 Each motor must have a disconnect switch:

3.4.6.1 Disconnect switch without fuse and rated power compliant with CSA C22.2 No. 4.

3.4.6.2 The VFD drive disconnect must be equipped with 2N/O and 2N/C auxiliary contacts.

3.4.6.3 Must have the ability to padlock switches in on-off position with three locks.

3.4.6.4 Must have a mechanically locked door to prevent opening when the handle is in the ON position.

3.4.7 (Transient Voltage Surge Suppression - TVSS)

3.4.7.1 Must have single-pulse overcurrent current capability: based on standard $8 \times 20\mu\text{s}$ ANSI/IEEE C62.41 current waveform.

3.4.7.2 Must comply with standard UL 1449, 4th edition Suppressed Voltage Rating (SVR).

3.5 THE MANUFACTURER'S REPRESENTATIVES

3.5.1 The Contractor must provide a technically qualified manufacturer's representative for each piece of equipment. The manufacturer's representative must attend installation work, train operation and maintenance personnel, and test the system for a sufficient interval to ensure that the equipment is installed, operated, and maintained in accordance with the manufacturer's recommended procedures.

3.5.2 The manufacturer's representative must carry out a detailed inspection of the installation and all other elements necessary to ensure the equipment's proper operation.

3.5.3 The manufacturer's representative must identify all unresolved defects in the installation.

3.5.4 The manufacturer's representative must submit a copy of the manufacturer's list of deficiencies and inspections to the 202WD representative along with the factory test and demonstration report (see section 1.10).

3.6 IDENTIFICATION

3.6.1 The Contractor must identify all industrial, mechanical, and electrical equipment as well as services provided in this contract.

3.6.2 The Contractor must supply a non-heat sensitive, corrosion resistant nameplate securely attached to the components of the hydraulic test bench system with the following information:

3.6.2.1 Name of the manufacturer.

3.6.2.2 Address.

3.6.2.3 Manufacturer's model number and serial number.

3.6.2.4 Tank capacity.

3.6.2.5 Flow.

3.6.2.6 Pressure.

3.6.2.7 Date of manufacture (month and year).

3.6.2.8 Motor: voltage, Hz, phase, power factor, service, frame size.

3.6.3 The Contractor must include the ULC (Underwriters Laboratories Canada) or CSA (Canadian Standards Association) registration logos and those of other organizations.

3.6.4 The Contractor must label all valves and provide a list of valves, indicating function, flow rates, etc.

3.6.5 The Contractor must supply the following size A1 laminate drawings for mounting in the motor cabin.

3.6.5.1 Diagram of equipment, piping, valves, control, etc.

3.6.5.2 Diagram of test bench components, piping, valves, controls, gauges, etc.

3.6.5.3 Control wiring diagram, including all control panels and components.

3.6.6 The Contractor must identify the electrical equipment with the nameplates and labels as follows:

3.6.6.1 Identify the wiring using permanent indelible identification marks, coloured number strip on plastic tapes, at both ends of the outgoing phase conductors and branch circuit wiring.

3.6.6.2 Maintain phase sequence and colour-coding in accordance with CSA C22.1 throughout the process.

3.6.6.3 Provide slip-on identification for wiring inside distribution panel, control cabinets or starter panels, etc.

3.7 SHIPPING, PROTECTION AND STORAGE

3.7.1 Prior to shipment, the Contractor must supply the equipment assembly drawings, including the breakdown of system components and the installation plan. The quantity, size and weight of cases, runners, packaged components, etc. must be identified.

3.7.2 Equipment must be stored in a secure location to prevent deterioration or damage prior to installation.

3.7.3 All factory-finished items must be packaged and crated to protect their finishes.

3.7.4 Operating and mobile equipment must be fully protected from the elements.

3.7.5 All crates, equipment, etc. must be clearly labelled, describing the contents, weight and lifting points.

3.7.6 The Contractor must ensure that all necessary precautions are taken during the loading and unloading of the equipment and its subsequent storage.

3.7.7 The test bench must be able to pass through an 80-inch-wide door; the power unit and tank must be able to pass through a 65-inch-wide door.

3.8 START-UP PROCEDURES

3.8.1 Prior to starting up equipment and systems, the Contractor must verify that all protective devices are installed and operational.

3.8.2 After starting the pumps, the Contractor must check for safe operation.

3.8.3 The Contractor must check the installation, operation of mechanical seals, cable gland type seals and adjust if necessary.

3.8.4 The Contractor must perform a break-in of the pumps for a sufficiently long interval to confirm proper operation.

3.8.5 The Contractor must verify the operation of all protective devices under low and zero flow conditions.

3.8.6 The Contractor must check the operation of all controls.

3.8.7 The Contractor must check pressure drop on filters.

3.8.8 The Contractor must adjust all liquid flows.

3.8.9 The Contractor must check equipment-lubricating oil levels.

3.9 TESTS AND COMMISSIONING

3.9.1 The Contractor must submit the commissioning schedule to the 202WD representative for review, six weeks prior to the proposed start date.

3.9.2 The Contractor must supply the initial filling and priming of the hydraulic oil in the tank and the system piping.

3.9.3 The Contractor must test the hydraulic piping and the vessels and components connected to a minimum of 41.34 MPa (6000 psi).

3.9.4 The Contractor must test the hydraulic test bench system at 100% of rated flow and pressure.

3.9.5 After testing and commissioning, the Contractor must replace all "worn" components.

3.9.6 On-site testing and commissioning:

3.9.6.1 Commissioning and acceptance tests on site must be carried out by a specialist.

3.9.6.2 Must provide CSA certification for the installation as a whole.

3.9.6.3 Must provide hook-up for all power and controls.

3.9.6.4 On-site commissioning and testing must ensure that the components deliver performance that meets specifications.

3.9.6.5 The Contractor must submit the site tests and commissioning report for the 202WD representative's files.

3.9.6.6 The Contractor's professional engineer must submit certification, final testing, and commissioning reports to the 202WD representative, indicating that the system has been designed and installed to meet all specified and applicable codes.

3.10 DEMONSTRATION AND TRAINING

3.10.1 Demonstration of operation and maintenance of equipment and systems for personnel representing 202WD must be carried out no later than two weeks after all power-up tests are completed.

3.10.2 The 202WD representative will provide a list of personnel (maximum 12 people) to be instructed and coordinate their attendance at agreed times.

3.10.3 Demonstrations and instructions:

3.10.3.1 Must demonstrate the start-up, use, control, adjustment, troubleshooting, servicing, and maintenance of each equipment at the agreed times, at the designated location.

3.10.3.2 Demonstration of testing five random components listed in Appendix A-3 - Equipment List, to confirm that the hydraulic system is capable of controlling components across the full range of component flow and pressure requirements. The 202WD representative will provide the five components to be tested.

3.10.3.3 The Contractor must include a control systems specialist to demonstrate all aspects of controls and monitoring functionality to the user-group personnel. The specialist must demonstrate the use of the software package to write the test procedures for five of the test components. All equipment used during the training must be returned to the 202WD representative after the demonstrations.

3.10.3.4 The software package must be designed to be user-friendly and not require external resources to troubleshoot or write additional test programs.

3.10.3.5 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.

3.10.3.6 Review the contents of the manual in detail to explain aspects of operation and maintenance.

3.10.3.7 Prepare and insert additional data into operation and maintenance manuals, when necessary during the instructions.

3.10.3.8 Explain to personnel how to customize test reports and enter manufacturer data using data-acquisition software.

3.10.4 Minimum time allocated for demonstrations and training:

3.10.4.1 Hydraulic bench: 40 hours

3.10.4.2 Hydraulic mechanical system: 24 hours

3.10.4.3 Electrical system: 40 hours

3.10.4.4 Mechanical support system: 24 hours

3.10.5 All documentation used for training (videos, PowerPoint, etc.) must be submitted to the technical authority in electronic format.

3.11 WARRANTY, MAINTENANCE AND OPERATIONAL SUPPORT SERVICES

3.11.1 The Contractor must provide a 24-month warranty for the system as a whole from the date of issuance of the provisional Certificate of Completion (commissioning to follow training).

3.11.2 The Contractor must provide maintenance and operational support services for the equipment supplied for a period of 24 months from the date of the provisional Certificate of Completion, as required. The Contractor must schedule a minimum of twelve (12) 8-hour site visits to deliver on-site operational support and 100 hours of telephone or online support.

3.11.3 The Contractor must be reachable from 8:00 a.m. to 4:00 p.m. Monday through Friday. The Contractor's technician must respond within 48 hours following a call from the Department of National Defence.

3.11.4 The technician must provide a verbal report and a detailed written report to the manager in place on the repairs carried out during each visit.

3.11.5 The Contractor must provide operational support in French or English.

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MTA170
CCC No./N° CCC - FMS No./N° VME

3.12 CLEANING

3.12.1 The Contractor must keep the work in order, without accumulation of waste and debris, including those caused by other contractors under his responsibility.

3.12.2 Once the installation is complete, the Contractor must refurbish damaged or deteriorated factory finished surfaces.

ANNEX A-1

CODES, STANDARDS AND PERMITS

1. National Building Code, most recent edition (2015), errata, revisions and supplements.
2. Code de Construction du Québec C22.10-F18, most recent edition (2018), errata, revisions and supplements.
3. National Fire Code, most recent edition (2015), errata, revisions and supplements.
4. CSA-C22.1-12: Canadian Electrical Code, Part 1 (22nd edition), 2012, Safety Standard for Electrical Installations.
5. CAN3-C235-83(R2015): Preferred voltage levels for AC systems, 0 to 50,000V.
6. National Plumbing Code of Canada, 2015.
7. Canadian Standards Association (CSA International) applicable standards, most recent edition.
8. CSA-S832-06 (R2014), Seismic Risk Reduction of Operational and Functional Components of Buildings.
9. American Society for Testing and Materials (ASTM) applicable standards, most recent edition.
10. ASTM A182/A182M - 19: Standard Specification for Forged or Rolled Alloy and Stainless Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
11. ASME/ANSI B16.11-2016: Forged Fittings, Socket-Welding and Threaded.
12. ISO 4406: 2017: Hydraulic fluid power – Fluids – Method for coding the level of contamination by solid particles.
13. ASME/ANSI B31.1-2018: Power and Process Piping.
14. Canadian General Standards Board (CGSB) applicable standards, most recent edition.
15. Underwriters' Laboratories of Canada (ULC) applicable standards, most recent edition.
16. Electrical and Electronic Manufacturers Association of Canada (EEMAC).
17. National Electrical Safety Code Product Line (NESC).
18. IEEE C37.20.7-2007: IEEE Guide for Testing Metal-Enclosed Switchgear Rated Up to 38 kV for Internal Arcing Faults.
19. CSA-Z432-16: Safeguarding of machinery.
20. Z460-13 (R2018) Control of hazardous energy – Lockout and other methods.
21. Z107.58-15: Noise Emission Declarations for Machinery.

ANNEX A-2

TEST-PROCEDURE MODELS

a) Hydraulic accumulator test procedure

1. Place the accumulator on the test console or appropriate work surface adjacent to the test console and secure it.
2. Attach the gauge device to the charge connection at the gas end of the accumulator.
3. Select the appropriate hose/valve layout and connect the fluid port to the test console.
4. Make sure that the nitrogen pre-charge of the accumulator is correct. Note the preload gauge if necessary.
5. Apply power to test console controls and circulation pumps. Make note of liquid temperature and adjust heating/cooling devices as needed.
6. Make sure the test console pressure controller is set to minimum and the flow control is closed. Turn on the main pump.
7. Open the dispenser on the console. Open the flow control valve to allow fluid to enter the accumulator.
8. Note that the accumulator will not charge up until the pressure at the fluid port is greater than the gas preload.
9. Increase the pressure regulator until the specified test pressure is reached.
10. Tilt the directional control valve to empty the material into the tank. Note that the accumulator will discharge at a rate controlled by a flow control valve. It is recommended to perform the first charge/discharge cycles on a bladder accumulator at a slow speed to allow the bladder to adjust to the inside of the shell without twisting or kinking.
11. Once satisfied with the performance of the accumulator at a controlled flow rate, the flow control valve can be opened to allow the accumulator to discharge more quickly. Repeat the charge/discharge cycle as many times as necessary to ensure consistent performance.
12. Inspect for external leaks.
13. When the accumulator is discharged, disconnect the fluid port from the test console.
14. Drain and plug the fluid port.
15. Record the nitrogen pre-charge pressure. Note that the pressure level returns to the reading recorded before the test. If the reading is lower than that recorded previously, it may indicate a nitrogen leak.

b) Hydraulic motor test procedure

1. Select the appropriate adapter flange and secure it to the appropriate test stand using socket head screws.
2. Mount the motor in the test device, making note of the orientation of the inlet, outlet, and housing drain holes.
3. Fill the motor housing with hydraulic fluid from a clean container to ensure lubrication of internal components at start-up.
4. Select the test hoses according to the maximum expected pressure and flow rate.
5. Connect the inlet, outlet, and housing drain ports using the appropriate port adapters and test hoses. The test hoses are fitted with quick couplings. (Note that a housing drain leak measurement may be required if the leak is less than the minimum capacity of the drain flow meter. This will require the use of a quick disconnect fitting that is not equipped with a valve and that will capture/measure the leak.)
6. Connect all hoses to the appropriate test console ports.
7. Apply power to test console and circulation pump controls. Make note of the liquid's temperature and adjust heating/cooling devices as appropriate.
8. Make sure the pressure relief and regulating valves are set to their minimum to ensure the pump starts empty.

9. Toggle the directional control valve to direct fluid to the inlet port and open the flow control valve.
10. Increase the pressure regulator setting and adjust flow control to allow the motor to run at its rated speed. Make note of any vibration, excessive mechanical noise, external leakage, etc.
11. Close the flow control valve, reduce the pressure regulator setting, and stop the motor's rotation.
12. A casing drain leakage measurement must be obtained under load. The method for making this measurement varies depending on the type of motor.
13. **Axial or radial piston motors** can be "gagged" to obtain a static measurement of the crankcase drainage rate under load. Attach the appropriate drive adapter and mechanical gag to the motor shaft and secure it to the test fixture.
14. Toggle the directional control valve to direct fluid to the inlet port and open the flow control valve.
15. Increase pressure regulator setting to maximum test pressure and record crankcase drain flow rate.
16. **Gear or vane motors** require dynamic loading for accurate measurement of crankcase drain flow. To that end, the motor must be configured to drive an appropriately sized test pump.
17. Select the appropriate adapter flange and secure it to the appropriate test stand using pan head screws.
18. Mount the pump in the test device, making note of the orientation of the inlet, outlet and body drain holes.
19. Fill the pump body with hydraulic fluid from a clean container to ensure lubrication of internal components at start-up.
20. Select the test hoses according to the maximum expected pressure and flow rate.
21. Connect the suction, discharge, and drain ports of the housing using the appropriate port adapters and test hoses.
22. Connect all hoses to the appropriate test console ports.

c) Hydraulic pump test procedure

1. Select the appropriate adapter flange and secure it to the appropriate test stand using socket head screws.
2. Fit the pump in the test device, making note of the orientation of the suction, discharge, and crankcase drain ports.
3. Select the appropriate drive coupling halves and install them on the pump and drive motor. Engage the coupling halves and secure the pump and motor to the device.
4. Fill the pump body with hydraulic fluid from a clean container to ensure lubrication of internal components at start-up.
5. Select the test hoses according to the maximum expected pressure and flow rate.
6. Connect the suction, discharge and drain ports of the housing using the appropriate port adapters and test hoses. The test hoses are fitted with quick couplings. (Note that a crankcase drain leakage measurement may be necessary if the leakage is less than the minimum capacity of the drain flow meter. This will require the use of a quick disconnect fitting that is not equipped with a valve and that will capture/measure the leak.)
7. Connect all hoses to the appropriate test console ports.
8. Apply power to test console controls and circulation pumps. Make note of the liquid's temperature and adjust heating/cooling devices as needed.
9. Make sure that the test pump back pressure valve and test pump relief valve are set to their minimum to ensure the pump starts empty.
10. Turn on the drive motor momentarily ("bump") to make sure that the set-up is free to rotate and that the motor's rotation is correct.
11. Start the drive motor and let the pump run for a short time without load. Make sure the pump is creating a flow. At this point, it may be necessary to introduce/adjust the boost pressure so that the pump has sufficient flow at suction.
12. Make note of any vibration, excessive mechanical noise, external leakage, etc.
13. Slowly increase back pressure and relief setting until desired pressure/flow values are attained.
14. Allow the pump to run for the required time to ensure consistent performance. Make note of vibrations, excessive mechanical noise, external leaks, and excessive heat.
15. Record performance data, i.e. fluid pressure, flow rate, speed, and temperature.

*** Depending on the complexity of the set-up/adjustments or repairs required during the procedure, testing time can be up to 7 hours.

d) Linear hydraulic actuator test procedure

1. Place the actuator on the test console or on a suitable work surface adjacent to the test console and secure it.
2. Select the appropriate connectors and hoses and connect to the "Actuator Test" ports of the test console.
3. Apply power to test console controls and circulation pumps. Make note of the liquid's temperature and adjust heating/cooling devices as appropriate.
4. Make sure the test console pressure controller is set to minimum and the flow control is closed. Switch on the main pump unit.
5. Open the directional control valve on the console to direct fluid to the retracted side of the cylinder. Flow control valve in the "open seam" position to allow fluid to enter the actuator.
6. Directional control switch to allow fluid to enter the extended side of the cylinder.
7. Adjust the pressure regulator to the cylinder test pressure and open the flow control valve to allow the actuator to extend fully.
8. Successively activate several extension/retraction cycles. Make note of all external or binding leaks as the rod moves.
9. Fully extend the actuator.
10. Minimize the pressure setting of the pressure regulator and close the flow-regulating valve.
11. Disconnect the hose from the retracted end of the actuator and leave the port open for observation.
12. Tilt the directional control valve to direct fluid to the actuator port. Open flow control. Adjust the pressure regulator to test the pressure. Observe the open port for any leaks. Fluid flow from the open port will indicate a leak past the piston seals.
13. Minimize the pressure setting of the pressure regulator and close the flow-regulating valve.
14. Reconnect the hose to retract the actuator orifice.
15. Tilt the directional control valve to direct the fluid to retract the actuator. Open flow control. Adjust the pressure regulator to test the pressure.
16. Disconnect the hose from the actuator extension port, leave the port open for observation.
17. Observe the open port for any leaks. Fluid flow from the open port will indicate a leak past the piston seals.
18. Minimize the pressure setting of the pressure regulator and close the flow-regulating valve. Deactivate the directional control valve.
19. Record pressures and observations.
20. Disconnect the hoses from the actuator. Drain the fluid and plug the ports. Duration of the test approximately 2 hours.

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CCC No./N° CCC - FMS No./N° VME

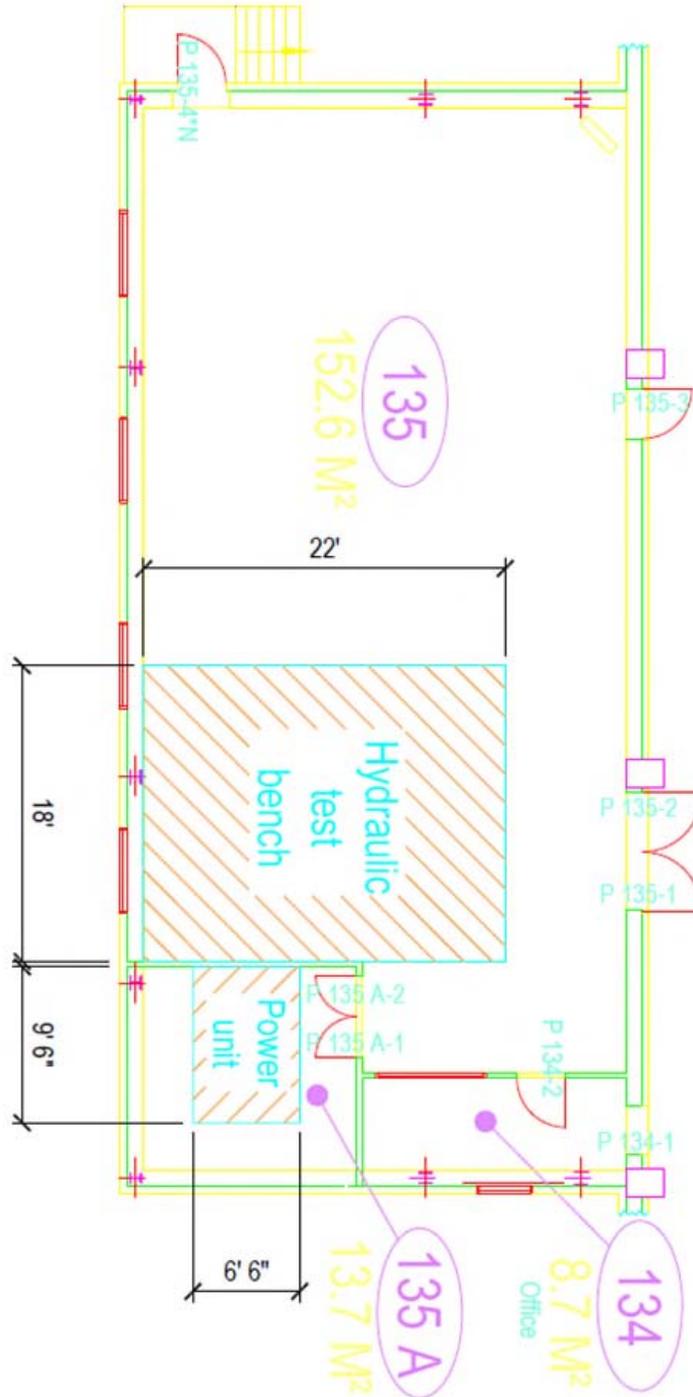
ANNEX A-3

LIST OF EQUIPMENT TO BE TESTED

See attached document

ANNEX A-4

LOCATION OF HYDRAULIC TEST BENCH SYSTEMS



ANNEX "B"

BASIS OF PAYMENT

SCHEDULE OF MILESTONES

1.0 Provide a total firm price, including the provision for all labour, equipment, materials, transportation, and anything else needed for the complete and compliant performance of the work for all the milestones bellow (M1 to M11).

2.0 TOTAL PRICE (M1+M2+M3+M4+M5+M6+M7+M8+M9+M10+M11): \$ _____ *

**If currency other than CAD \$, please indicate: _____*

**Customs duties included.*

**Applicable Taxes extra.*

3.0 The schedule of milestones for which payments will be made in accordance with the contract:

Milestone	Milestone Description (Deliverables)	Firm amount Percentage of the total value of the contract
M1	3D file with spatial representation of the test bench, accepted by the representative of 202DA. (see 1.9 and 1.11.1 at Annex A)	5%
M2	Report following the second progress meeting and approval of project milestones, accepted by the representative of 202DA. (see 1.11.2 at Annex A)	5%
M3	Submissions: electronic copies of all drawings and documents, French and English versions. (see 1.6 at Annex A)	5%
M4	Report following the third progress meeting and approval of project milestones, accepted by the representative of 202DA. (see 1.11.3 at Annex A)	5%
M5	Report of in-plant test and demonstration, approved and accepted by the representative of 202DA. (see 1.10 at Annex A)	5%

M6	Delivery of a hydraulic test bench in accordance with the specifications in Annex A, with all parts and accessories (including all packaging and transportation fees).	20%
M7	Installation, commissioning, and testing of the hydraulic test bench system in accordance with the specifications in Annex A, and cleaning and waste disposal.	20%
M8	Closure documents: complete manual and electronic copies of all drawings and documents, French and English versions (see 1.7 at Annex A), including shop drawings for the seismic restraint and drawings for vibration insulation (see 1.13 and 1.14 at Annex A).	5%
M9	Training and demonstrations on the use and maintenance of the test bench equipment and system in accordance with the specifications at Annex A.	5%
M10	Final acceptance by 202DA of the hydraulic test bench and all works specified in Annex A.	20%
M11	Warranty, maintenance, and operational support for a period of 24 months for the system in its entirety starting on the date of issuance of the provisional Certificate of Completion (commissioning to follow training). (see Annex A)	5%

ANNEX "C"

SECURITY REQUIREMENTS CHECK LIST

 Government of Canada / Gouvernement du Canada	Contract Number / Numéro du contrat
	W1985-212030
	Security Classification / Classification de sécurité UNCLASSIFIED

**SECURITY REQUIREMENTS CHECK LIST (SRCL)
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)**

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE		
1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine	DÉFENSE NATIONALE	2. Branch or Directorate / Direction générale ou Direction 202 DÉPÔT D'ATELIER
3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant	
4. Brief Description of Work / Brève description du travail REPLACEMENT BANC D'ESSAIS HYDRAULIQUE / INSTALLATION / FORMATION ET MAINTENANCE		
5. a) Will the supplier require access to Controlled Goods? Le fournisseur aura-t-il accès à des marchandises contrôlées?	<input checked="" type="checkbox"/> No / Non	<input type="checkbox"/> Yes / Oui
5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?	<input checked="" type="checkbox"/> No / Non	<input type="checkbox"/> Yes / Oui
6. Indicate the type of access required / Indiquer le type d'accès requis		
6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c.) (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c.)	<input checked="" type="checkbox"/> No / Non	<input type="checkbox"/> Yes / Oui
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.	<input type="checkbox"/> No / Non	<input checked="" type="checkbox"/> Yes / Oui
6. c) Is this a commercial courier or delivery requirement with no overnight storage? S'agit-il d'un contrat de messagerie ou de livraison commerciale sans entreposage de nuit?	<input checked="" type="checkbox"/> No / Non	<input type="checkbox"/> Yes / Oui
7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès		
Canada <input type="checkbox"/>	NATO / OTAN <input type="checkbox"/>	Foreign / Étranger <input type="checkbox"/>
7. b) Release restrictions / Restrictions relatives à la diffusion		
No release restrictions / Aucune restriction relative à la diffusion <input type="checkbox"/>	All NATO countries / Tous les pays de l'OTAN <input type="checkbox"/>	No release restrictions / Aucune restriction relative à la diffusion <input type="checkbox"/>
Not releasable / À ne pas diffuser <input type="checkbox"/>		
Restricted to: / Limité à: <input type="checkbox"/>	Restricted to: / Limité à: <input type="checkbox"/>	Restricted to: / Limité à: <input type="checkbox"/>
Specify country(ies): / Préciser le(s) pays:	Specify country(ies): / Préciser le(s) pays:	Specify country(ies): / Préciser le(s) pays:
7. c) Level of information / Niveau d'information		
PROTECTED A / PROTÉGÉ A <input type="checkbox"/>	NATO UNCLASSIFIED / NATO NON CLASSIFIÉ <input type="checkbox"/>	PROTECTED A / PROTÉGÉ A <input type="checkbox"/>
PROTECTED B / PROTÉGÉ B <input type="checkbox"/>	NATO RESTRICTED / NATO DIFFUSION RESTREINTE <input type="checkbox"/>	PROTECTED B / PROTÉGÉ B <input type="checkbox"/>
PROTECTED C / PROTÉGÉ C <input type="checkbox"/>	NATO CONFIDENTIAL / NATO CONFIDENTIEL <input type="checkbox"/>	PROTECTED C / PROTÉGÉ C <input type="checkbox"/>
CONFIDENTIAL / CONFIDENTIEL <input type="checkbox"/>	NATO SECRET / NATO SECRET <input type="checkbox"/>	CONFIDENTIAL / CONFIDENTIEL <input type="checkbox"/>
SECRET / SECRET <input type="checkbox"/>	COSMIC TOP SECRET / COSMIC TRÈS SECRET <input type="checkbox"/>	SECRET / SECRET <input type="checkbox"/>
TOP SECRET / TRÈS SECRET <input type="checkbox"/>		TOP SECRET / TRÈS SECRET <input type="checkbox"/>
TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) <input type="checkbox"/>		TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) <input type="checkbox"/>

TBS/SCT 350-103(2004/12)

Security Classification / Classification de sécurité
UNCLASSIFIED





Contract Number / Numéro du contrat W1985-212030
Security Classification / Classification de sécurité UNCLASSIFIED

PART A (continued) / PARTIE A (suite)

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS? No Yes
If Yes, indicate the level of sensitivity:
Dans l'affirmative, indiquer le niveau de sensibilité:

9. Will the supplier require access to extremely sensitive INFOSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate? No Yes

Short Title(s) of material / Titre(s) abrégé(s) du matériel:
Document Number / Numéro du document:

PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

<input checked="" type="checkbox"/> RELIABILITY STATUS COTE DE FIABILITE	<input type="checkbox"/> CONFIDENTIAL CONFIDENTIEL	<input type="checkbox"/> SECRET SECRET	<input type="checkbox"/> TOP SECRET TRÈS SECRET
<input type="checkbox"/> TOP SECRET - SIGINT TRÈS SECRET - SIGINT	<input type="checkbox"/> NATO CONFIDENTIAL NATO CONFIDENTIEL	<input type="checkbox"/> NATO SECRET NATO SECRET	<input type="checkbox"/> COSMIC TOP SECRET COSMIC TRÈS SECRET
<input type="checkbox"/> SITE ACCESS ACCÈS AUX EMPLACEMENTS			

Special comments:
Commentaires spéciaux: _____

NOTE: If multiple levels of screening are identified, a Security Classification Guide must be provided.
REMARQUE: Si plusieurs niveaux de contrôle de sécurité sont requis, un guide de classification de la sécurité doit être fourni.

10. b) May unscreened personnel be used for portions of the work?
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail? No Yes
If Yes, will unscreened personnel be escorted?
Dans l'affirmative, le personnel en question sera-t-il escorté? No Yes

PART C - SAFEGUARDS (SUPPLIER) / PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

11. a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information or assets on its site or premises?
Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS? No Yes

11. b) Will the supplier be required to safeguard COMSEC information or assets?
Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC? No Yes

PRODUCTION

11. c) Will the production (manufacture, and/or repair and/or modification) of PROTECTED and/or CLASSIFIED material or equipment occur at the supplier's site or premises?
Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ? No Yes

INFORMATION TECHNOLOGY (IT) MEDIA / SUPPORT RELATIF À LA TECHNOLOGIE DE L'INFORMATION (TI)

11. d) Will the supplier be required to use its IT systems to electronically process, produce or store PROTECTED and/or CLASSIFIED information or data?
Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS? No Yes

11. e) Will there be an electronic link between the supplier's IT systems and the government department or agency?
Disposera-t-on d'un lien électronique entre le système informatique du fournisseur et celui du ministère ou de l'agence gouvernementale? No Yes



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Security Classification / Classification de sécurité UNCLASSIFIED

PART C - (continued) / PARTIE C - (suite)

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.
Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form **online** (via the Internet), the summary chart is automatically populated by your responses to previous questions.
Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category Catégorie	PROTECTED PROTÉGÉ			CLASSIFIED CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL	SECRET	TOP SECRET TRÈS SECRET	NATO RESTRICTED NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL	NATO SECRET	COMSEC TOP SECRET COMSEC TRÈS SECRET	PROTECTED PROTÉGÉ			CONFIDENTIAL	SECRET	TOP SECRET TRÈS SECRET
											A	B	C			
Information / Assets Renseignements / Biens																
Production																
IT Media / Support TI																
IT Link / Lien électronique																

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?
La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE? No / Non Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".
Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?
La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE? No / Non Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).
Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquer qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).

ANNEX "D"

MANDATORY TECHNICAL CRITERIA

Bidders must demonstrate each of these mandatory technical criteria with documents and/or brochures and/or technical drawings, which must be presented with their proposal.

No.	Mandatory technical criteria to be demonstrated (see Annex A)	Reference: Please indicate where these technical criteria are demonstrated in your technical submission (page and/or section).
1.4.1	The contractor must have at least five (5) years of confirmed experience in the design, manufacture, and installation of custom-made hydraulic test bench systems. The contractor must supply proof of such experience, including at least the following information: company name, areas of activity, number of years of experience, and a list of the most important projects achieved in the past 5 years.	
1.4.2	<p>The contractor must supply a list of at least two (2) projects of similar capacity and functionality from the past 10 years for which the contractor designed and built hydraulic test bench systems. "Similar capacity and functionality" refers to projects for which the contractor designed, supplied, installed, and commissioned a hydraulic test bench system designed to test the equipment specified in Article 1.2 – Testing equipment. In addition, such test benches must possess at least the following characteristics:</p> <p>1.4.2.1 Maximum supplied flow of at least 100 litres per minute at 230 bar</p> <p>1.4.2.2 Maximum supplied pressure of at least 300 bar at 90 litres per minute</p> <p>1.4.2.3 Independent adjustment of flow and pressure, by manual and digital means, and controlled by an electrical signal at the pump outlet</p> <p>1.4.2.4 Each outlet has its pressure indicator with a reading accuracy of at least 0.25%</p> <p>1.4.2.5 The value of the project must exceed \$750,000</p>	
1.4.3	The contractor must supply references for each project that appears on the aforementioned list at Article 1.4.2. The contractor must supply at least the name and telephone number or electronic mail address of one resource person. If only the telephone number is supplied, it will be used to obtain the resource person's e-mail address since reference audits are conducted by electronic mail.	

2.1.2	The stand must be specific to the following type of oil: MIL-H 6083.	
2.1.4.1	The maximum supplied flow from the main power supply must be at least 250 litres per minute at 230 bar.	
2.1.4.2	The maximum supplied pressure from the main power supply must be at least 410 bar at 90 litres per minute.	
2.1.4.3	Setting adjustments for flow and pressure must be independent of each other.	
2.1.4.6	All components must withstand in-service pressure of at least 410 bar.	
2.1.7.3	Test jigs must be universal and designed to test different pumps (submersible, non-submersible) and motors, which must be tested in compliance with the standards of the Society of Automotive Engineers (SAE) and the Deutsches Institut für Normung (DIN).	
2.1.7.5.1	Worktables must be designed to prevent oil spills from the test bench in the event of an incident.	
2.1.7.5.3	<p>Worktables must be equipped with a safety cage that can be closed during testing and meet the following requirements:</p> <p>2.1.7.5.3.1 Be openable to provide full access in front of, to the sides of, and above the stand</p> <p>2.1.7.5.3.2 Be transparent (except the frame)</p> <p>2.1.7.5.3.3 Be easy to clean</p> <p>2.1.7.5.3.4 Be impact-resistant</p> <p>2.1.7.5.3.5 Not be made of metal wire mesh</p>	
2.1.8.1	<p>The contractor must supply all manometers (pressure gauge) and flow meters required to display at least the following information readings during testing for all test functions and flow and pressure readings:</p> <p>2.1.8.1.1 Flow</p> <p>2.1.8.1.2 Temperature of the fluid</p> <p>2.1.8.1.3 Pressure</p> <p>2.1.8.1.4 Motor shaft and pump RPMs</p> <p>2.1.8.1.5 Oil quality</p> <p>2.1.8.1.6 Temperature of the oil</p> <p>2.1.8.1.7 Vibration</p> <p>2.1.8.1.8 Torque</p> <p>2.1.8.1.9 Power</p>	

	2.1.8.1.10 Vacuum	
2.1.10.1	The stand must have two (2) pressure outlets identified as C1 and C2.	
2.1.10.2	Outlets must be controlled by a timer that is activated when pressure is applied. Whenever the cyclical mode is selected, the connections must alternate between outlet and automatic return (whenever C1 is set to outlet and C2 to return and inversely).	
2.2.2	The storage tank must be made of stainless steel 316 welded for corrosion-prevention.	
2.3.3	The booster pump must be able to supply boost pressure up to 1,380 bar for static tests. The stand must be able to test hydrostatic transmissions.	
2.4.1	The test bench must be equipped with a programmable logic controller (PLC) system and PC-compatible console that must include control and data-acquisition software enabling at least the following functions:	
	2.4.1.1 Conduct automated test programs (data to be entered by users)	
	2.4.1.2 Provide frequency of sampling of programmable data on the basis of the type and duration of testing (the frequency must be defined by users). Manually adjust all system-testing flows and pressures prior to and during the test	
	2.4.1.3 Save data readings from all meters and gauges during testing	
	2.4.1.4 Monitor and consult data readings from previous tests to compare performance results	
	2.4.1.5 Consult the manufacturer's testing data to compare performance results (data must be entered by users)	
	2.4.1.6 Calculate test results (efficacy, losses, etc.)	
	2.4.1.7 Print test results in a report format (format may be personalized by users)	
2.4.1.7.1 The system must be able to supply digital and graphical results in the report		
2.4.8.8	The screen must include measurement sensors built into the test bench that calibrate automatically.	
2.4.9.2.2	Pressure measurements must be accurate to $\pm 0.25\%$ of the functional range set by the American Society of Mechanical Engineers (ASME) B40.100 Grade 3A.	
2.4.9.4.1	Gear-type flow meters must be used (volumetric gear flow meter).	
2.6.1	The system must have a built-in loop filter to keep the fluid clean (kidney loop filter). Circulate the hydraulic fluid constantly in the	

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	tanks and pipes. To achieve an ISO cleanliness code below or equal to 13/11/8 per ISO 4406:2017, the oil must be filtered. The system must not be calibrated more than once a year.	
2.6.7	The water's contamination level must always be below the saturation point of MIL-H-6083 at 45°C. Contamination must be measured in real time by two independent systems and the gauges must be visible to operators at all times.	
2.7.1	The contractor must supply a cooling system for hydraulic systems to maintain the temperature of the hydraulic fluid within a consistent range.	
2.7.4	The resulting heat must be released outside the main building.	
2.7.5	Must comply with Canadian standards with respect to the environment and machine safety (Commission des normes, de l'équité, de la santé et de la sécurité du travail (CNESST)).	
2.7.6	The system must remain at ground level.	

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ANNEX "E"

ELECTRONIC PAYMENT INSTRUMENTS

The Bidder accepts any of the following Electronic Payment Instrument(s):

- VISA Acquisition Card;
- MasterCard Acquisition Card;
- Direct Deposit (Domestic and International);
- Electronic Data Interchange (EDI).

ANNEX "G"

FEDERAL CONTRACTORS PROGRAM FOR EMPLOYMENT EQUITY - CERTIFICATION

I, the Bidder, by submitting the present information to the Contracting Authority, certify that the information provided is true as of the date indicated below. The certifications provided to Canada are subject to verification at all times. I understand that Canada will declare a bid non-responsive, or will declare a contractor in default, if a certification is found to be untrue, whether during the bid evaluation period or during the contract period. Canada will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply with any request or requirement imposed by Canada may render the bid non-responsive or constitute a default under the Contract.

For further information on the Federal Contractors Program for Employment Equity visit [Employment and Social Development Canada \(ESDC\)-Labour's](#) website.

Date: _____(YYYY/MM/DD) (If left blank, the date will be deemed to be the bid solicitation closing date.)

Complete both A and B.

A. Check only one of the following:

- A1. The Bidder certifies having no work force in Canada.
- A2. The Bidder certifies being a public sector employer.
- A3. The Bidder certifies being a [federally regulated employer](#) being subject to the [Employment Equity Act](#).
- A4. The Bidder certifies having a combined work force in Canada of less than 100 permanent full-time and/or permanent part-time employees.
- A5. The Bidder has a combined workforce in Canada of 100 or more employees; and
 - A5.1. The Bidder certifies already having a valid and current [Agreement to Implement Employment Equity](#) (AIEE) in place with ESDC-Labour.

OR

- A5.2. The Bidder certifies having submitted the [Agreement to Implement Employment Equity](#) (LAB1168) to ESDC-Labour. As this is a condition to contract award, proceed to completing the form Agreement to Implement Employment Equity (LAB1168), duly signing it, and transmit it to ESDC-Labour.

B. Check only one of the following:

- B1. The Bidder is not a Joint Venture.

OR

- B2. The Bidder is a Joint Venture and each member of the Joint Venture must provide the Contracting Authority with a completed annex Federal Contractors Program for Employment Equity - Certification. (Refer to the Joint Venture section of the Standard Instructions)