



**RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:**

**Bid Receiving
PWGSC
33 City Centre Drive
Suite 480C
Mississauga
Ontario
L5B 2N5
Bid Fax: (905) 615-2095**

**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 Growth Chamber Replacement	
Solicitation No. - N° de l'invitation 01689-180221/A	Date 2017-08-21
Client Reference No. - N° de référence du client 01689-180221	
GETS Reference No. - N° de référence de SEAG PW-\$TOR-008-7344	
File No. - N° de dossier TOR-7-40027 (008)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2017-10-02	Time Zone Fuseau horaire Eastern Daylight Saving Time EDT
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: Leslie, Sandra	Buyer Id - Id de l'acheteur tor008
Telephone No. - N° de téléphone (780) 616-2057 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: DEPARTMENT OF AGRICULTURE AND AGRI-FOOD 1391 Sandford Street London Ontario N5V4T3 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

Public Works and Government Services Canada
Ontario Region
33 City Centre Drive
Suite 480
Mississauga
Ontario
L5B 2N5

Delivery Required - Livraison exigée See Herein	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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PART 1 - GENERAL INFORMATION

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 [Industrial Security Program \(ISP\)](http://ssi-iss.tpsgc-pwgsc.gc.ca/index-eng.html) of Public Works and Government Services Canada (<http://ssi-iss.tpsgc-pwgsc.gc.ca/index-eng.html>) website.

2 Requirement

Agriculture and Agri-Food Canada (AAFC), requires the supply and installation of sixteen (16) standard production model controlled environment growth chambers (described in this document as Chamber Types A, B and C) capable of producing and maintaining optimum conditions suitable for plant growth and insect rearing at AAFC's London Research and Development Centre located at 1391 Sandford Street, London, Ontario, Canada, by March 31, 2018 in accordance with the specifications detailed herein.

Quantities of each chamber type to be supplied and installed under this contract are as follows:

- a. Four (4) Chamber Type A.
- b. Eight (8) Chamber Type B.
- c. Four (4) Chamber Type C.

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.

4 Trade Agreements

The requirement is subject to the provisions of the World Trade Organization Agreement on Government Procurement (WTO-AGP), the North American Free Trade Agreement (NAFTA), and the Canadian Free Trade Agreement (CFTA).

PART 2 - BIDDER INSTRUCTIONS

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](#) (2017-04-27) 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: 90 days

1.1 SACC Manual Clauses

B100T Condition of Material 2014-06-26

2 Submission of Bids

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

3 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than ten (10) 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.

4 Applicable Laws

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

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.

PART 3 - BID PREPARATION INSTRUCTIONS

1 Bid Preparation Instructions

Canada requests that Bidders provide their bid in separately bound sections as follows:

Section I: Technical Bid	4 hard copies
Section II: Financial Bid	1 hard copy
Section III: Certifications	1 hard copy

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

Canada requests that Bidders follow the format instructions described below in the preparation of their bid:

- (a) use 8.5 x 11 inch (216 mm x 279 mm) paper;
- (b) use a numbering system that corresponds to the bid solicitation.

In April 2006, Canada issued a policy directing federal departments and agencies to take the necessary steps to incorporate environmental considerations into the procurement process [Policy on Green Procurement](http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ecologisation-greening/achats-procurement/politique-policy-eng.html>). To assist Canada in reaching its objectives, Bidders should:

- 1) use 8.5 x 11 inch (216 mm x 279 mm) paper containing fibre certified as originating from a sustainably-managed forest and containing minimum 30% recycled content; and
- 2) use an environmentally-preferable format including black and white printing instead of colour printing, printing double sided/duplex, using staples or clips instead of cerlox, duotangs or binders.

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. The total amount of Applicable Taxes must be shown separately.

1.1 Electronic Payment of Invoices – Bid

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

If Annex "G" 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.

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1.2 Exchange Rate Fluctuation

C3011T (2013-11-06), Exchange Rate Fluctuation

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

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.

1.1 Technical Evaluation

1.1.1 Mandatory Technical Criteria

Failure to meet any of the following mandatory criteria at solicitation closing will render your submission non-compliant and given no further consideration.

- a) Bidder supplied equipment and services must meet or better all of the requirements described in Annex "A1 and Annex A2", Requirement;
- b) The supplied equipment must be new, not used or refurbished; and
- c) Bidder must pass all the Mandatory evaluation criteria which are included in Annex "E".

1.2 Financial Evaluation

Total Evaluated Bid Price will be calculated as follows;

- (a) Items in column A will be multiplied by items in column B to equal items in column C
- (b) The aggregate of items in column C (1-6) for Part A and B will equal the Total Evaluated Bid Price.

NOTE: Annex B - section 7 - travel will not form part of the evaluation – bidders must provide an estimated travel and living cost.

SACC Manual Clause [A0220T](#) (2014-06-26), Evaluation of Price

2 Basis of Selection

2.1 Mandatory Technical Criteria

A bid must comply with the requirements of the bid solicitation and meet all mandatory technical evaluation criteria to be declared responsive. The responsive bid with the lowest evaluated price will be recommended for award of a contract.

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.

1 Certifications Required with the Bid

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

1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the *Ineligibility and Suspension Policy* (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide with its bid the required documentation, as applicable, to be given further consideration in the procurement process.

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.

2.1 Integrity Provisions – Required Documentation

In accordance with the *Ineligibility and Suspension Policy* (<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.

2.2 Federal Contractors Program for Employment Equity - Bid Certification

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](http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969) website (http://www.esdc.gc.ca/en/jobs/workplace/human_rights/employment_equity/federal_contractor_program.page?&_ga=1.229006812.1158694905.1413548969).

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.

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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 [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. **(ANNEX H)**

PART 6 - RESULTING CONTRACT CLAUSES

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

1 Security Requirements

1.1 The following security requirements (SRCL and related clauses provided by ISP) 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 Canadian Industrial Security Directorate (CISD), Public Works and Government Services Canada (PWGSC).
2. The Contractor/Offeror personnel requiring access to sensitive work site(s) must EACH hold a valid RELIABILITY STATUS, granted or approved by CISD/PWGSC.

Until the security screening of the Contractor personnel required by this Contract has been completed satisfactorily by CISD, PWGSC, the Contractor personnel **MAY NOT ENTER** sites without an escort.

3. Subcontracts which contain security requirements are NOT to be awarded without the prior written permission of CISD/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).

2 Requirement

The Contractor must provide the items detailed under the "Requirement" at Annexes "A1 and A2".

2.1 Optional Goods and Services

The Contractor grants to Canada the irrevocable option to acquire the Optional Goods and Services described at Annex B Basis of Payment of the Contract under the same conditions and at the prices and/or rates stated in the Contract for one (1) additional year period from contract award to March 31, 2019. The option may only be exercised by the Contracting Authority and will be evidenced, for administrative purposes only, through a contract amendment.

The Contracting Authority may exercise the option at any time in the one year period by sending a written notice to the Contractor.

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.

3.1 General Conditions

[2010A](#) (2016-04-04), General Conditions - Goods (Medium Complexity), apply to and form part of the Contract.

3.2 Supplemental General Conditions

SACC Manual Clauses 4001, (2015-04-01), Hardware Purchase, Lease and Maintenance
SACC Manual Clauses 4003, (2010-08-16), Licensed Software

SACC Manual Clauses 4004, (2013-04-25), Maintenance and Support Services for Licensed Software
apply to and form part of the Contract.

4 Term of Contract

4.2 Delivery Date

All the deliverables must be received on or before March 31.2018.

4.5 Delivery Points

Delivery of the requirement will be made to delivery point(s) specified at Annex "A1" of the Contract.

5 Authorities

5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Sandra Leslie
Title: Procurement Specialist
Public Works and Government Services Canada
33 City Centre Drive, Suite 480C
Mississauga, ON. L5B 2N5

Telephone: 905-615-2069
Facsimile: (905) 615-2060
E-mail address: sandra.leslie2@pwgsc-tpsgc.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.

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5.2 Project Authority

The Project Authority for the Contract is: **(will be inserted at contract award)**

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.

5.3 Contractor's Representative (To Be Filled Out By bidder)

Name: _____
Title: _____
Organization: _____
Address: _____

Telephone: _____ - _____ - _____
Facsimile: _____ - _____ - _____
E-mail address: _____

6. Payment

6.1 Basis of Payment

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid firm unit price (s), as specified in Annex B for a cost of \$ _____ (insert the amount at 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.

6.2 Limitation of Price

SACC Manual Clauses, C6000C (2011-05-16), Limitation of Price

6..3 Method of Payment - Multiple Payments

Canada will pay the Contractor upon completion and delivery of units in accordance with the payment provisions of the Contract if:

- a. an accurate and complete invoice and any other documents required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- b. all such documents have been verified by Canada;
- c. the Work delivered has been accepted by Canada.

6.4 Electronic Payment of Invoices – Contract

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);
- e. Wire Transfer (International Only);
- f. Large Value Transfer System (LVTS) (Over \$25M)

7 Invoicing Instructions

The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.

2. Invoices must be distributed as follows:
 - a. The original and one (1) copy must be forwarded to the address shown on page 1 of the Contract for certification and payment.
 - b. One (1) copy must be forwarded to the Contracting Authority identified under the section entitled "Authorities" of the Contract.

8 Certifications and Additional Information

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.

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.

9 Applicable Laws

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 province or territory as specified by the Bidder in its bid, if applicable*)

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
4003, (2010-08-16), Licensed Software
4004, (2013-04-25), Maintenance and Support Services for Licensed Software;
- (c) the general conditions [2010A](#) (2016-04-04), General Conditions - Goods (Medium Complexity)
- (d) Annex A1, Requirement, Technical Specification; Annex A2 Installation;
- (e) Annex "B" Basis of Payment
- (f) Annex C, Security Requirements Check List;
- (g) Annex D, Insurance Requirement
- (h) the Contractor's bid dated _____ (*insert date of bid*) (*If the bid was clarified or amended, insert at the time of contract award: " , as clarified on _____ " or " , as amended on _____ " and insert date(s) of clarification(s) or amendment(s)*)

11. Insurance Requirements

The Contractor must comply with the insurance requirements specified in Annex D. The Contractor must maintain the required insurance coverage for the duration of the Contract. Compliance with the insurance requirements does not release the Contractor from or reduce its liability under the Contract.

The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any additional insurance coverage is at the Contractor's expense, and for its own benefit and protection.

The Contractor must forward to the Contracting Authority within ten (10) days after the date of award of the Contract, a Certificate of Insurance evidencing the insurance coverage and confirming that the insurance policy complying with the requirements is in force. For Canadian-based Contractors, coverage must be placed with an Insurer licensed to carry out business in Canada, however, for Foreign-based Contractors, coverage must be placed with an Insurer with an A.M. Best Rating no less than "A-". The Contractor must, if requested by the Contracting Authority, forward to Canada a certified true copy of all applicable insurance policies.

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

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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.

13. Foreign Nationals (Canadian Contractor) or Foreign Nationals (Foreign Contractor)

SACC Manual clause **A2000C**, 2006-06-16, Foreign Nationals (Canadian Contractor)

OR

SACC Manual clause, A2001C, 2006-06-16, Foreign Nationals (Foreign Contractor)

14. SACC Manual Clauses

A9068C (2010-01-11), Government Site Regulations
A9039C (2008-05-12), Salvage
B1501C, (2006-06-16), Electrical Equipment
B7500C, (2006-06-16), Excess Goods
C2000C (2007-11-30), Taxes - Foreign-based Contractor
D0018C, (2017-11-30), Delivery and Unloading

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ANNEX "A" REQUIREMENT

(ATTACHED TENDER ISSUE SPECIFICATIONS)

**ANNEX "B" BASIS OF PAYMENT
 PRICING REQUIREMENTS – FIRM PRICE**

NOTE: Upon issuance of the Contract, wording that is italicized will be deleted from Annex B.

The bidder must provide a separate firm price for each line listed in this Basis of Payment.

1. The prices must be firm, in Canadian dollars, FOB destination, applicable customs and duties, DDP (delivery duty paid) to specified delivery location below.
2. Firm Unit Price quoted must not include applicable taxes. Applicable taxes will be added as a separate line item to any invoices issued as a result of the contract.

DELIVERY LOCATION:

Agriculture and Agri-Food Canada
 London Research and Development Centre
 1391 Sandford Street
 London, Ontario, N5V 4T3
 Canada

A. INITIAL ORDER

ITEM	DESCRIPTION	UNIT OF ISSUE	QUANTITY (A)	FIRM UNIT PRICE (B)	EXTENDED PRICE (C) = A x B
1	Chamber Type A. - in accordance with the requirements in Annex "A1", Requirement	EACH	4	\$ _____	\$ _____
2	Chamber Type B. - in accordance with the requirements in Annex "A1", Requirement	EACH	8	\$ _____	\$ _____
3	Chamber Type C. - in accordance with the requirements in Annex "A1", Requirement	EACH	4	\$ _____	\$ _____
4	Delivery - in accordance with the requirements in Annex "A2", Requirement	LOT	1	\$ _____	\$ _____
5	Supply, installation and commissioning, testing - in accordance with the requirements in Annex "A1 and A2",	LOT	1	\$ _____	\$ _____
6	On-site training - in accordance with the requirements in Annex "A2", Requirement.	LOT	1	\$ _____	\$ _____
Subtotal A: (total of items 1 – 6)					\$ _____

7. On-site training - Travel and Living Expenses - National Joint Council Travel Directive

For all travel incurred for the on-site training as per section 6

The Contractor will be reimbursed its authorized travel and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for profit and/or administrative overhead, in accordance with the meal, private vehicle and incidental expenses provided in Appendices B, C and D of the National Joint Council Travel Directive and with the other provisions of the directive referring to "travellers", rather than those referring to "employees".

All travel must have the prior authorization of the *Project Authority*.

All payments are subject to government audit.

Estimated Cost: \$ _____ .

NOTE: Section 7 - travel will not form part of the evaluation – bidders must provide an estimated travel and living cost.

B. OPTIONAL GOODS AND SERVICES

ITEM	DESCRIPTION	UNIT OF ISSUE	QUANTITY	FIRM PRICE
1	Chamber Type A. - in accordance with the requirements in Annex "A1", Requirement	EACH	1	\$ _____
2	Single unit cost for supply, installation, commissioning, testing, and onsite training for subsequent order.	LOT	1	\$ _____
3	Chamber Type B. - in accordance with the requirements in Annex "A1", Requirement	EACH	1	\$ _____
4	Single unit cost for supply, installation, commissioning, testing, and onsite training for subsequent order.	LOT	1	\$ _____
5	Chamber Type C. - in accordance with the requirements in Annex "A1", Requirement	EACH	1	\$ _____
6	Single unit cost for supply, installation, commissioning, testing, and onsite training for subsequent order.	LOT	1	\$ _____
Subtotal B: total of items 1 – 6)				

Subtotal: **A + B = BID PRICE**

This amount will be used to calculate Bidders total price for evaluation \$ _____

ANNEX "C" SECURITY REQUIREMENTS CHECK LIST



SRCL 4433-872017

Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

**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	Agriculture and Agri-Food Canada	2. Branch or Directorate / Direction générale ou Direction Science and Technology Branch
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 Project: London RDC – Growth Chamber Replacement Manufacturer to supply and install sixteen (16), standard production model controlled environment growth chambers. All work to be done during regular working hours.		
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		
5. 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
5. 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"/> Not releasable / À ne pas diffuser <input type="checkbox"/> Restricted to: / Limité à: <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays:	All NATO countries / Tous les pays de l'OTAN <input type="checkbox"/> Restricted to: / Limité à: <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays:	No release restrictions / Aucune restriction relative à la diffusion <input type="checkbox"/> Restricted to: / Limité à: <input type="checkbox"/> 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"/>



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

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 / Non Yes / Oui
 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 / Non Yes / Oui
 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 FIABILITÉ	<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 : *Must be escorted at all times until clearances are granted*

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 / Non Yes / Oui
 If Yes, will unscreened personnel be escorted?
 Dans l'affirmative, le personnel en question sera-t-il escorté? No / Non Yes / Oui

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 / Non Yes / Oui

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 / Non Yes / Oui

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 / Non Yes / Oui

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 / Non Yes / Oui

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 / Non Yes / Oui



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

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 CONFIDENTIEL	SECRET	TOP SECRET TRÈS SECRET	NATO RESTRICTED	NATO CONFIDENTIAL	NATO SECRET	COSMIC TOP SECRET COSMIC TRÈS SECRET	PROTECTED PROTÉGÉ			CONFIDENTIAL	SECRET	TOP SECRET TRÈS SECRET	
							NATO DIFFUSION RESTREINTE	NATO CONFIDENTIEL	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 indiquez qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).

Security Classification / Classification de sécurité



ANNEX "D" INSURANCE REQUIREMENT

A) COMMERCIAL GENERAL LIABILITY INSURANCE

1. The Contractor must obtain Commercial General Liability Insurance, and maintain it in force throughout the duration of the Contract, in an amount usual for a contract of this nature, but for not less than \$2,000,000 per accident or occurrence and in the annual aggregate.
2. The Commercial General Liability policy must include the following:
 - a. Additional Insured: Canada is added as an additional insured, but only with respect to liability arising out of the Contractor's performance of the Contract. The interest of Canada should read as follows: Canada, as represented by Public Works and Government Services Canada.
 - b. Bodily Injury and Property Damage to third parties arising out of the operations of the Contractor.
 - c. Products and Completed Operations: Coverage for bodily injury or property damage arising out of goods or products manufactured, sold, handled, or distributed by the Contractor and/or arising out of operations that have been completed by the Contractor.
 - d. Personal Injury: While not limited to, the coverage must include Violation of Privacy, Libel and Slander, False Arrest, Detention or Imprisonment and Defamation of Character.
 - e. Cross Liability/Separation of Insureds: Without increasing the limit of liability, the policy must protect all insured parties to the full extent of coverage provided. Further, the policy must apply to each Insured in the same manner and to the same extent as if a separate policy had been issued to each.
 - f. Blanket Contractual Liability: The policy must, on a blanket basis or by specific reference to the Contract, extend to assumed liabilities with respect to contractual provisions.
 - g. Employees and, if applicable, Volunteers must be included as Additional Insured.
 - h. Employers' Liability (or confirmation that all employees are covered by Worker's compensation (WSIB) or similar program)
 - i. Broad Form Property Damage including Completed Operations: Expands the Property Damage coverage to include certain losses that would otherwise be excluded by the standard care, custody or control exclusion found in a standard policy.
 - j. Notice of Cancellation: The Insurer will endeavour to provide the Contracting Authority thirty (30) days written notice of policy cancellation.
 - k. If the policy is written on a claims-made basis, coverage must be in place for a period of at least 12 months after the completion or termination of the Contract.
 - l. Owners' or Contractors' Protective Liability: Covers the damages that the Contractor becomes legally obligated to pay arising out of the operations of a subcontractor.
 - m. Non-Owned Automobile Liability - Coverage for suits against the Contractor resulting from the use of hired or non-owned vehicles.
 - q. Sudden and Accidental Pollution Liability (minimum 120 hours): To protect the Contractor for liabilities arising from damages caused by accidental pollution incidents.

- r. Litigation Rights: Pursuant to subsection 5(d) of the *Department of Justice Act*, S.C. 1993, c. J-2, s.1, if a suit is instituted for or against Canada which the Insurer would, but for this clause, have the right to pursue or defend on behalf of Canada as an Additional Named Insured under the insurance policy, the Insurer must promptly contact the Attorney General of Canada to agree on the legal strategies by sending a letter, by registered mail or by courier, with an acknowledgement of receipt.

For the province of Quebec, send to:

*Director Business Law Directorate,
Quebec Regional Office (Ottawa),
Department of Justice,
284 Wellington Street, Room SAT-6042,
Ottawa, Ontario, K1A 0H8*

For other provinces and territories, send to:

*Senior General Counsel,
Civil Litigation Section,
Department of Justice
234 Wellington Street, East Tower
Ottawa, Ontario K1A 0H8*

A copy of the letter must be sent to the Contracting Authority. Canada reserves the right to co-defend any action brought against Canada. All expenses incurred by Canada to co-defend such actions will be at Canada's expense. If Canada decides to co-defend any action brought against it, and Canada does not agree to a proposed settlement agreed to by the Contractor's insurer and the plaintiff(s) that would result in the settlement or dismissal of the action against Canada, then Canada will be responsible to the Contractor's insurer for any difference between the proposed settlement amount and the amount finally awarded or paid to the plaintiffs (inclusive of costs and interest) on behalf of Canada.

B) ERRORS AND OMISSIONS LIABILITY INSURANCE

1. The Contractor must obtain Errors and Omissions Liability (a.k.a. Professional Liability) insurance, and maintain it in force throughout the duration of the Contract, in an amount usual for a contract of this nature but for not less than \$1,000,000 per loss and in the annual aggregate, inclusive of defence costs.
2. If the policy is written on a claims-made basis, coverage must be in place for a period of at least 12 months after the completion or termination of the Contract.
3. The following endorsement must be included:

Notice of Cancellation: The Insurer will endeavour to provide the Contracting Authority thirty (30) days written notice of cancellation.

ANNEX “E” TECHNICAL EVALUATION

TECHNICAL CRITERIA

TECHNICAL CRITERIA

Bidders’ technical bid is to provide information for two (2) areas, identified as follows:

- .1 While all items listed in Annex “A” are mandatory, each bid will be reviewed for compliance with the extracts of the requirements listed below. Bids that do not meet items indicated below will be considered nonresponsive and will receive no further consideration. It remains obligation of the successful bidder to meet all remaining requirements detailed in Annex “A”.
- .2 The Bidder must submit with their bid, a completed Table A and B along with supporting documentation to demonstrate that their proposed products meet the corresponding items. Documentation may include specification sheets or descriptive literature that demonstrates that the chambers offered meets the minimum requirements in Annex “A”. If the specification sheets or literature DO NOT address a required specification the Bidder must submit a compliance statement for those items stating how the requirement is being met.
 - a) Proof of compliance for select requirements.
 - b) Bidders to complete and include with their bid.
 - c) Include the referenced and supporting documentation with bid.

TABLE A		
	General Information	Cross-reference to documentation provided, Annex , Page No., Item No. etc.
1	<p>The manufacturer of the proposed equipment must have successfully completed at least three (3) projects for supply and installation of similar equipment and in similar configuration.</p> <p>The Bidder must provide reference details of these projects:</p> <ol style="list-style-type: none"> 1. Model and quantity of chambers 2. Front end controller configuration 3. Client name and address 4. Contact name and phone number or e-mail address of the name of the reference <p>These references may be contacted to confirm supply and installation was a success.</p>	
2	<p>Manufacturer must ensure a Nationally Recognized quality program, such as ISO9001, is used in the order, design and manufacturing processes of the growth chambers as well as all supplied product. The Bidder must submit a copy of the certificate with their bid.</p>	

TABLE B		
	Growth Chamber Technical Specifications Select Requirements from Annex "A"	Cross-reference to documentation provided, Annex , Page No., Item No. etc.
	Quality Control Requirements	
1	All electrical equipment supplied under the Contract must be certified or approved for use in accordance with the Canadian Electrical Code, Part 1 by a certified organization accredited by the Standards Council of Canada.	
2	All chambers must be provided with product certification to CSA (Canadian Standards Association) and/or ULC (Underwriters Laboratories of Canada). Proof of product certification must be provided.	
	Growth Chambers Requirements	
3	Contractor must ensure equipment and labor includes a warranty for a minimum of two (2) years from date of on-site installation and operation verification.	
4	During warranty period, response to service calls must be within 8 hours of call placement; 7 days per week. A qualified and certified service technician must be on site within 24 hours during regular business day.	
5	All chambers must be equipped with heavy duty swivel casters and levelling legs.	
6	All chambers' wall panel construction must be woodless with CFC-free insulation.	
7	Each growth chamber must be configured for 60Hz, 120/208 – 3phase – 4 wire plus ground electrical service.	
8	Connections for condenser cooling water supply and return must be at top of all chambers.	
9	Growth chambers must be designed for water cooling of condensing unit. 25°C processing cooling water is available at site. Contractor must ensure this is compatible with the chamber refrigeration systems.	
10	Humidification systems for all chambers must operate with Owner's RO water supply. Existing RO supply pressure is 30psi and is available within 1m of each of the intended new growth chamber locations. Contractor to ensure this is adequate for all chamber humidification systems.	
11	Cooling/Refrigeration System: Chambers must be equipped with a water cooled, hermetically sealed, hot gas bypass condensing unit. Condensing unit must include 3 way water valve and hand operated shut off bypass valve. Chamber must have an electromagnetic 3 way proportional valve that smoothly modulates heating and cooling.	
	Chamber Type A	
12	Exterior of panels must be aluminium with baked on enamel paint, or at least 22 gauge electrogalvanized steel or high polished stainless steel.	
13	Interior panels and doors must be finished with high reflective	

	white enamel baked on smooth aluminium sheets, or at least 22 gauge electrogalvanized steel with high reflective white paint, or high reflective specular aluminium finish, or high polished stainless steel.	
14	Internal growth capacity must be no less than 78 ft ³ with an interior growth space height of at least 55" (measured from top of growth floor to bottom of lighting canopy in highest position).	
15	Exterior dimensions must be a maximum of 105" wide x 35" deep x 78" high.	
16	Each growth chamber must be equipped with two full height, front mounted, reach-in doors complete with stainless steel hinges. Each door must be a minimum of 26" wide. Doors must fully and tightly seal with gasket against door frame in closed position. Door must be equipped with a thermal observation window with light tight cover.	
17	Each chamber must be equipped with a corrosion resistant and waterproof (non-leaking) drain pan under growth floor.	
18	Light canopy must use combination T5HO linear fluorescent and incandescent lamps. Lighting must provide an intensity of up to 875 micromoles/m ² /s or more (measured at 6" at 25°C) in at least 3 approximately equal intensity stages (not including total darkness).	
19	Contractor must provide factory installed quantum light meter for display purposes (in units of µmoles/m ² /s) and recording of light output supplied in each new chamber.	
20	Range: During full ventilation mode (with max ambient temperature of 30°C), chambers must operate with a minimum temperature range of 4°C to 44°C with lights off and 10°C to 44°C with lights on. Chambers must be able to control temperature to within ± 0.5°C of set point.	
21	Monitoring: High and low pressure transducers must be provided for real time monitoring of the condition of the refrigeration system. Control systems must be able to log and alarm high/low pressure exceedances of user specified alarm audio/visual values.	
22	Must provide additive humidity to achieve up to 90% Relative Humidity (RH) with lights off and 85% RH with lights on, limited by a 25 °C maximum dew point. Assume 21°C, 50% RH ambient air.	
23	Growth area floor must be constructed of removable, aluminium or stainless steel perforated panels allowing conditioned air movement in a vertical direction through the plants. Air flow speed to be adjustable and programmable from a low speed to a maximum of 50ft/min.	
24	Each growth chamber must be equipped with at least two (2), 1" diameter or greater port with light tight cap.	
25	Each growth chamber must be equipped with at least one (1), internally mounted 120V AC duplex receptacles, rated and protected for damp locations and wired with overload protection.	
26	Each chamber must be equipped with a hose bib and connected to the control system for timed control of automatic watering.	

	Chamber Type B	
27	Exterior of panels must be aluminium with baked on enamel paint, or at least 22 gauge electrogalvanized steel or high polished stainless steel.	
28	Interior panels and door must be finished with high reflective white enamel baked on smooth aluminium sheets, or at least 22 gauge electrogalvanized steel with high reflective white paint, or high reflective specular aluminium finish, or high polished stainless steel.	
29	Each growth chamber must be equipped with a single full height, front mounted, reach-in door complete with stainless steel hinges. Door opening must be a minimum of 25" wide. Door must fully and tightly seal with gasket against door frame in closed position. Door must be equipped with a thermal observation window with light tight cover.	
30	Internal growth capacity must be no less than 32 ft ³ with an interior growth space height of at least 46" (measured from top of growth floor to bottom of lighting canopy in highest position).	
31	Exterior dimensions must be a maximum of 72" wide x 30" deep x 78" high.	
32	Each chamber must be equipped with a corrosion resistant and waterproof (non-leaking) drain pan under growth floor.	
33	Light canopy to use linear fluorescent and incandescent lamps. Lighting must provide an intensity of up to 575 micromoles/m ² /s or more (measured at 6" at 25°C) in at least 3 approximately equal intensity stages (not including total darkness).	
34	Contractor must provide factory installed quantum light meter for display purposes (in units of µmoles/m ² /s) and recording of light output supplied in each new chamber.	
35	Range: During full ventilation mode (with max ambient temperature of 30°C), chambers must operate with a minimum temperature range of 4°C to 44°C with lights off and 10°C to 44°C with lights on. Chambers must be able to control temperature to within ± 0.5°C of set point.	
36	Monitoring: High and low pressure transducers must be provided for real time monitoring of the condition of the refrigeration system. Control systems must be able to log and alarm high/low pressure exceedances of user specified alarm values.	
37	Must provide additive humidity to achieve up to 90% Relative Humidity (RH) with lights off and 85% RH with lights on, limited by a 25 °C maximum dew point. Assume 21°C, 50% RH ambient air.	
38	Growth area floor must be constructed of removable, aluminium or stainless steel perforated panels allowing conditioned air movement in a vertical direction through the plants. Air flow speed to be adjustable and programmable from a low speed to a maximum of 45ft/min.	
39	Each growth chamber must be equipped with at least two (2), 1" diameter or greater port with light tight cap.	
40	Each growth chamber must be equipped with at least one (1), internally mounted 120V AC duplex receptacles, rated and protected for damp locations and wired with overload protection.	
41	Each chamber must be equipped with a hose bib and connected	

	to the control system for timed control of automatic watering.	
	Chamber Type C	
42	Exterior of walls must be powder coated steel or aluminum.	
43	Interior walls and door must be high reflective white powder-coated stainless steel.	
44	Each growth chamber must be equipped with a single full height and full width, front mounted door complete with stainless steel hinges. Door must fully and tightly seal with gasket against door frame in closed position. Door must be equipped with a thermal observation window with light tight cover.	
45	Internal growth volume must be no less than 29 ft ³ . Overall interior height dimension must be a minimum of 54".	
46	Exterior dimensions must be a maximum of 41" wide x 34" deep x 79" high.	
47	Interior growth area must be two tiered with adjustable shelves. Each shelf must support up to 60 lbs of distributed load.	
48	Light canopy must use linear T5HO fluorescent lamps. Lighting must provide an intensity of up to 500 micromoles/m ² /s or more over each tier (measured at 6" at 25°C). Lighting must be dimmable with at least 3 programmable intensity stages.	
49	Range: During full ventilation mode (with max ambient temperature of 30°C), chambers must operate with a minimum temperature range of 4°C to 40°C with lights off and 10°C to 44°C with lights on. Chambers must be able to control temperature to within ± 0.5°C of set point.	
50	Must provide additive humidity to achieve up to 90% Relative Humidity (RH) with lights off and 75% RH with lights on, limited by a 25 °C maximum dew point. Assume 21°C, 50% RH ambient air.	
51	Air movement speed in growth area must be adjustable.	
52	Each growth chamber must be equipped with at least one (1), 1" diameter or greater port with light tight cap.	
	Control System Requirements	
53	Existing system is Argus Titan system v1 build 00718.006. All components and software supplied under this contract must be compatible with this system to allow seamless integration and operation as a single networked system.	
54	Full graphical user interface that can be easily modified and/or expanded by user without resorting to 3rd party service providers. All user settings and system configuration settings are viewed and changed through the software interface.	
55	Each major component in the system must contain protection for each power and communications connection against electrical surge and transient damage, protection for all control outputs against contact arcing damage, as well as electrical surge and transient damage, electrical isolation for each major system component to prevent ground loops.	
56	Automated control applications must include capability for user to create and change safety limits, overrides, and custom programming rules and schedules.	
57	User must be able to develop and configure limit alarm conditions. Multiple configurable limit conditions must be able to	

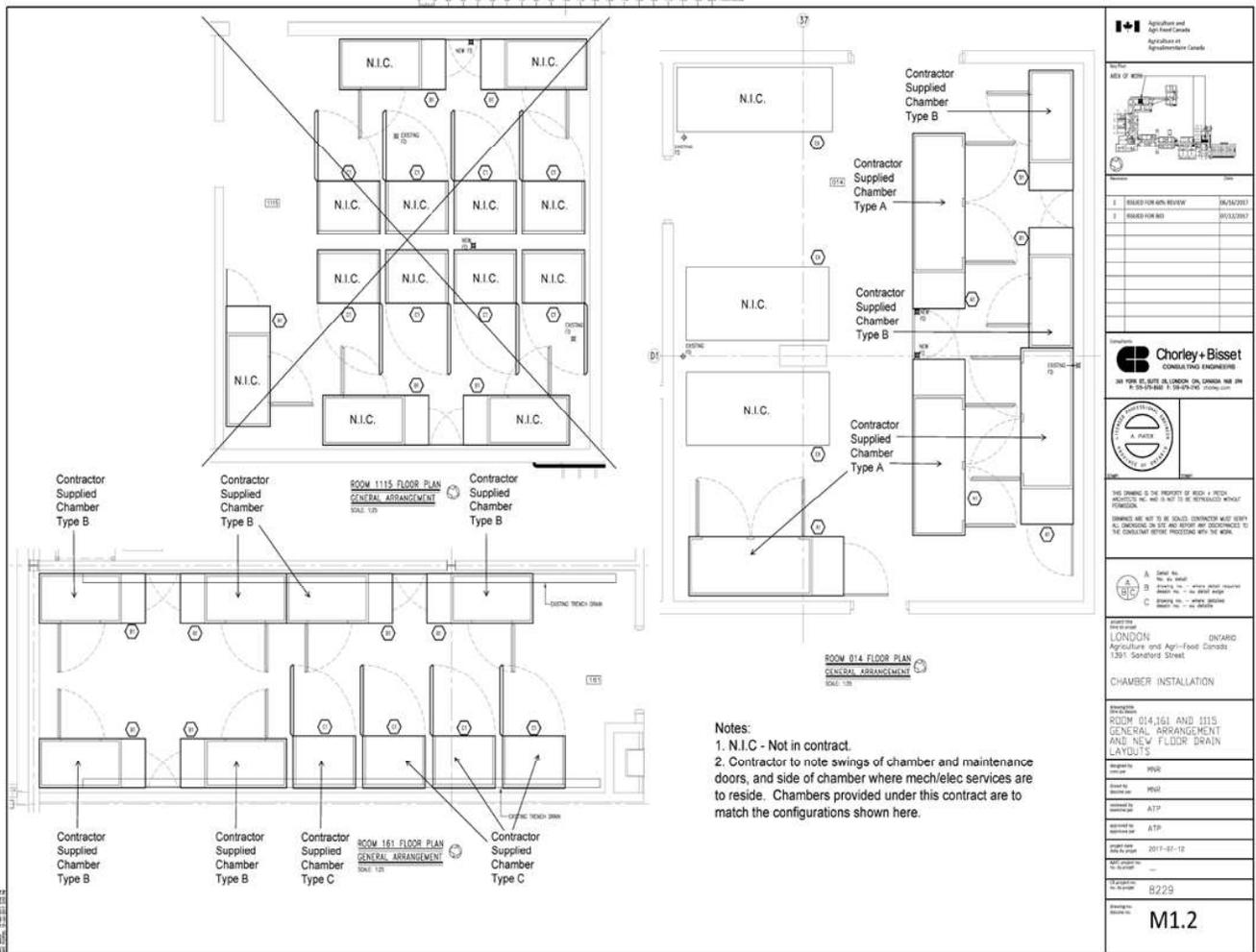
Solicitation No. - N° de l'invitation
01689-180221 /A
Client Ref. No. - N° de réf. du client
01689-180221

Amd. No. - N° de la modif.
File No. - N° du dossier
TOR-7-40027

Buyer ID - Id de l'acheteur
TOR008
CCC No./N° CCC - FMS No./N° VME

	be linked together to create more complex multi-condition alarms.	
58	Monitoring, data logging and storage: For each individual chamber, system must provide continuous monitoring, logging and storage of all chamber environmental variables, readings, settings and controls statuses, and alarms.	
59	Interface must provide means for user to easily search and filter archived data to present information in a clear tabular and graphical way. This includes ability to overlay any combination of recorded parameters on same graph. User must be able to zoom and pan the graphed data presentation and be able to export filtered data into common data file formats included Microsoft Excel.	
60	Controllers must be able to store and buffer recorded data and automatically back-up data to PC Server for retrieval and display in a graphical user interface. PC server will store data from all controllers on local hard drives.	
61	Each chamber must be equipped with a local LCD digital display of critical sensor measurements (temperature, humidity, PAR lighting) and control status. Local display must be mounted on exterior of chamber in a convenient location to allow operator to read values without having to open chamber door.	

ANNEX "F" MECHANICAL DRAWINGS



<p>1. ISSUED FOR BIDDING REVIEW 06/26/2017</p> <p>2. ISSUED FOR BIDDING 09/20/2017</p>	
<p>Charley+Bisset CONSULTING ENGINEERING</p> <p>100 WILSON BLVD SUITE 200 LONDON ON CANADA N6C 2W8 P: 519-375-8882 F: 519-375-2943 charley.com</p>	
<p>THIS DRAWING IS THE PROPERTY OF CHORLEY + BISSET ENGINEERING INC. AND IS NOT TO BE REPRODUCED WITHOUT PERMISSION.</p> <p>CONTRACTOR HAS NOT TO BE HELD RESPONSIBLE FOR ANY OMISSIONS OR ERRORS IN THIS DRAWING UNLESS THEY ARE IDENTIFIED TO THE CONTRACTOR BEFORE PROCEEDING WITH THE WORK.</p>	
<p>CHAMBER INSTALLATION</p> <p>ROOM 014, 181 AND 1115 GENERAL ARRANGEMENT AND NEW FLOOR DRAIN LAYOUTS</p> <p>PROJECT: P1808</p> <p>DATE: 06/26/2017</p> <p>DESIGNED BY: ATP</p> <p>DATE: 06/26/2017</p> <p>PROJECT NO.: 8229</p> <p>M1.2</p>	

Solicitation No. - N° de l'invitation
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TOR-7-40027

Buyer ID - Id de l'acheteur
TOR008
CCC No./N° CCC - FMS No./N° VME

ANNEX "G" to PART 3 OF THE BID SOLICITATION

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);
- Wire Transfer (International Only);
- Large Value Transfer System (LVTS) (Over \$25M)

ANNEX "H" to PART 5 OF THE BID SOLICITATION

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)

ANNEX "I" ADDITIONAL CERTIFICATIONS

1. Board of Directors

In accordance with Section 1, Integrity Provisions – Offer, Offerors are required to provide a list of their Board of Directors before contract award. Offerors are requested to provide this information in their bid.

Director Name - _____

2. Procurement Business Number (PBN)

In accordance with Section 2, Procurement Business Number, of the Standard Instructions, Offerors are required to have a Procurement Business Number (PBN) before Standing Offer award.

Procurement Business Number - _____

Suppliers may register for a PBN online at [Supplier Registration Information](#). For non-Internet registration, suppliers may contact the InfoLine at 1-800-811-1148 to obtain the telephone number of the nearest Supplier Registration Agent.

Project No.: 01689-180221
Growth Chamber
Replacement Project

Annex "A"

Agriculture and Agri-Food Canada
London Research and Development Centre
Growth Chamber Specification Requirements

TECHNICAL SPECIFICATIONS

ANNEX A1 REQUIREMENTS

1.1 GENERAL REQUIREMENTS

- .1 Agriculture and Agri-Food Canada (AAFC) requires the supply and installation of sixteen (16) standard production model controlled environment growth chambers (described in this document as Chamber Types A, B and C) capable of producing and maintaining optimum conditions suitable for plant growth and insect rearing at AAFC's London Research and Development Centre located at 1391 Sandford Street, London, Ontario, Canada, by March 31, 2018 in accordance with the specifications detailed herein.

Quantities of each chamber type to be supplied and installed under this contract are as follows:

- a. Four (4) Chamber Type A
 - b. Eight (8) Chamber Type B
 - c. Four (4) Chamber Type C
- .2 Three (3) chamber types are required in this contract, identified as Type A, B, and C throughout this document. All chambers must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications.
 - .3 Contractor must locate and install new growth chamber units in locations and orientations shown in Drawing Annex "F". Contractor must supply and install the chambers with the door swing directions (chamber and maintenance doors) shown, as well as with the mechanical/electrical services located on the correct side of chambers as shown.
 - .4 Walls, interiors and exteriors, must be easy to sanitize between chamber uses and able to withstand industrial grade cleaning products.
 - .5 All chambers must be equipped with heavy duty swivel casters and levelling legs.

1.2 WARRANTY

- .1 Contractor must ensure equipment and labor includes a warranty for a minimum of two (2) years from date of on-site installation and operation verification. Proof and details of warranty must be provided to Agriculture and Agri-Food Canada. The warranty must be comprehensive and cover all major components including but not limited to cabinet construction materials, controller, compressors, evaporators and all optional equipment provided with the chambers.
- .2 Response to service calls by Owner made under Warranty must be within 8 hours of call placement at any time of the week. A qualified and certified service technician must be on site within 24 hours during regular business day.

1.3 SUBMITTALS

- .1 Product Data: Submit manufacturer's product data, use limitations and recommendations for each product and system used. Provide manufacturers' certifications stating that products and systems comply with requirements. Submittal deadline is two (2) weeks after contract award.

- .2 Shop Drawings: Prepare and submit shop showing full product details including interior and exterior dimensions, refrigeration system layout, sensor and controls and communication ports, lighting canopy, humidification system, all service connection locations and details. Submittal deadline is two (2) weeks after contract award.
- .3 Factory testing: Provide factory start-up check-list and testing results for each chamber prior to delivery.
- .4 Commissioning, start up, fielding testing and inspection results.
- .5 Owner's Manuals: Provide complete set of owner operating and maintenance manuals.

1.4 GROWTH CHAMBER GENERAL REQUIREMENTS

.1 CHAMBER TYPE A

- .1 Wall panel construction:
 - .1 Must be woodless with CFC-free insulation.
 - .2 Exterior of panels must be aluminium with baked on enamel paint, or at least 22 gauge electrogalvanized steel or high polished stainless steel.
 - .3 Interior panels and doors must be finished with high reflective white enamel baked on smooth aluminium sheets, or at least 22 gauge electrogalvanized steel with high reflective white paint, or high reflective specular aluminium finish, or high polished stainless steel.
- .2 Doors:
 - .1 Each growth chamber must be equipped with two full height, front mounted, reach-in doors complete with stainless steel hinges. Each door must be a minimum of 26" wide.
 - .2 Doors must fully and tightly seal with gasket against door frame in closed position.
 - .3 Door must be equipped with a thermal observation window with light tight cover.
- .3 Internal dimensions:
 - .1 Internal growth capacity must be no less than 78 ft³ with an interior growth space height of at least 55" (measured from top of growth floor to bottom of lighting canopy in highest position).
- .4 Exterior dimensions:
 - .1 Outside dimensions must be a maximum of 105" wide x 35" deep x 78" high.
- .5 Floor
 - .1 Each chamber must be equipped with a removable aluminium or stainless steel perforated growth floor. See Ventilation section in this document for further details.
 - .2 Each chamber must be equipped with a corrosion resistant and waterproof (non-leaking) drain pan under growth floor. Pan drainage must be directed with adequately sized drain piping to existing floor drains at the site.

.2 CHAMBER TYPE B

- .1 Wall panel construction:
 - .1 Must be woodless with CFC-free insulation.

-
- .2 Exterior of panels must be aluminium with baked on enamel paint, or at least 22 gauge electrogalvanized steel or high polished stainless steel.
 - .3 Interior panels and door must be finished with high reflective white enamel baked on smooth aluminium sheets, or at least 22 gauge electrogalvanized steel with high reflective white paint, or high reflective specular aluminium finish, or high polished stainless steel.
 - .2 Door:
 - .1 Each growth chamber must be equipped with a single full height, front mounted, reach-in door complete with stainless steel hinges. Door opening must be a minimum of 25" wide.
 - .2 Door must fully and tightly seal with gasket against door frame in closed position.
 - .3 Door must be equipped with a thermal observation window with light tight cover.
 - .3 Internal dimensions:
 - .1 Internal growth capacity must be no less than 32 ft³ with an interior growth space height of at least 46" (measured from top of growth floor to bottom of lighting canopy in highest position).
 - .4 Exterior dimensions:
 - .1 Outside dimensions must be a maximum of 72" wide x 30" deep x 78" high.
 - .5 Floor
 - .1 Chamber must be equipped with a removable aluminium or stainless steel perforated growth floor. See Ventilation section in this document for further details.
 - .2 Each chamber must be equipped with a corrosion resistant and waterproof (non-leaking) drain pan under growth floor. Pan drainage must be directed with adequately sized drain piping to existing floor drains at the site.
 - .3 **CHAMBER TYPE C**
 - .1 Wall construction:
 - .1 Must be woodless with CFC-free insulation.
 - .2 Exterior of walls must be powder coated steel or aluminum.
 - .3 Interior walls and door must be high reflective white powder-coated stainless steel.
 - .2 Door:
 - .1 Each growth chamber must be equipped with a single full height and full width, front mounted door complete with stainless steel hinges.
 - .2 Door must fully and tightly seal with gasket against door frame in closed position.
 - .3 Door must be equipped with a thermal observation window with light tight cover.
 - .3 Internal dimensions:
 - .1 Internal growth volume must be no less than 29 ft³.
 - .2 Overall interior height dimension must be a minimum of 54".
 - .4 Exterior dimensions:
 - .1 Outside dimensions must be a maximum of 41" wide x 34" deep x 79" high.
 - .5 Tiers

- .1 Interior growth area must be two tiered with adjustable shelves.
- .2 Each shelf must support up to 60 lbs of distributed load.
- .3 Shelves must be corrosion resistant (i.e. powder coated steel or stainless steel).
- .6 Floor
 - .1 Each chamber must be equipped with a corrosion resistant and waterproof (non-leaking) condensate drain pan under growth floor. Pan drainage must be directed with adequately sized drain piping to existing floor drains at the site.

1.5 LIGHTING

.1 CHAMBER TYPE A

- .1 Chamber must be equipped with a single tier, adjustable, top suspended and counterbalanced lighting canopy.
- .2 Light canopy must use combination T5HO linear fluorescent and incandescent lamps.
- .3 Replacement lamps must be readily commercially available.
- .4 Intensity: Lighting must provide an intensity of up to 875 micromoles/m²/s or more (measured at 6" at 25°C) in at least 3 approximately equal intensity stages (not including total darkness).
- .5 Spectrum: Chamber must be equipped with a lighting canopy that will ensure a balance spectrum for plant growth and research purposes.
- .6 Maintenance: Must use energy efficient electronic ballasts and ensure ballasts are easily accessible for servicing and are cooled adequately by air circulating fans.
- .7 Must ensure fluorescent and incandescent lamps are controlled independently with a minimum of 3 programming levels for each lamp type (not including off).
- .8 Contractor must provide factory installed quantum light meter for display purposes (in units of $\mu\text{moles/m}^2/\text{s}$) and recording of light output supplied in each new chamber.

.2 CHAMBER TYPE B

- .1 Chamber must be equipped with a single tier, adjustable, top suspended and counterbalanced lighting canopy.
- .2 Light canopy must use linear fluorescent and incandescent lamps.
- .3 Replacement lamps must be readily commercially available.
- .4 Intensity: Lighting must provide an intensity of up to 575 micromoles/m²/s or more (measured at 6" at 25°C) in at least 3 approximately equal intensity stages (not including total darkness).
- .5 Spectrum: Chamber must be equipped with a lighting canopy that will ensure a balance spectrum for plant growth and research purposes.
- .6 Maintenance: Must use energy efficient electronic ballasts and ensure ballasts are easily accessible for servicing and are cooled adequately by air circulating fans.
- .7 Must ensure fluorescent and incandescent lamps are controlled independently with a minimum of 3 programming levels for each lamp type (not including off).
- .8 Contractor must provide factory installed quantum light meter for display purposes (in units of $\mu\text{moles/m}^2/\text{s}$) and recording of light output supplied in each new chamber.

.3 CHAMBER TYPE C

- .1 Chamber must be equipped with two tiers, top mounted, adjustable lighting canopies (providing two growth areas).
- .2 Light canopy must use linear T5HO fluorescent lamps.
- .3 Replacement lamps must be readily commercially available.
- .4 Intensity: Lighting must provide an intensity of up to 500 micromoles/m²/s or more over each tier (measured at 6" at 25°C). Lighting must be dimmable with at least 3 programmable intensity stages.
- .5 Maintenance: Must use energy efficient electronic ballasts and ensure ballasts are easily accessible for servicing and are cooled adequately by air circulating fans.
- .6 Must ensure tier of fluorescent lamps is controlled independently.

1.6 TEMPERATURE

.1 General

- .1 Connections for condenser cooling water supply and return must be at top of all chambers.

.2 CHAMBER TYPE A

- .1 Range: During full ventilation mode (with max ambient temperature of 30°C), chambers must operate with a minimum temperature range of 4°C to 44°C with lights off and 10°C to 44°C with lights on.
- .2 Chambers must be able to control temperature to within $\pm 0.5^\circ\text{C}$ of set point.
- .3 Must provide a programmable minimum and maximum temperature safety limits that automatically follows the programmed set point.
- .4 Must ensure an audible alarm is provided for all temperature safety limits and that activation of safety limit set points turns off power to the chamber.
- .5 Must provide a vertically adjustable sensing device located in the growth area to ensure growth area air is continuously drawn over the sensors for accurate controlling and recording at plant location.
- .6 Cooling/Refrigeration System:
 - .1 Chambers must be equipped with a water cooled, hermetically sealed, hot gas bypass condensing unit. All growth chambers must be connected to the site's constant flow process water cooling system supply and return system. Supply process water temperature is 25 °C.
 - .2 Condensing unit must include 3 way water valve and hand operated shut off bypass valve.
 - .3 Condensing unit must be easily accessible and located in machine compartment within the maximum equipment dimensions defined in this document.
 - .4 Chamber must have an electromagnetic 3 way proportional valve that smoothly modulates heating and cooling.
 - .5 Refrigeration system must be charged with CFC-free refrigerant.
 - .6 Evaporative coil must be copper-tube construction and phenolic coated.

- .7 Monitoring: High and low pressure transducers must be provided for real time monitoring of the condition of the refrigeration system. Control systems must be able to log and alarm high/low pressure exceedances of user specified alarm audio/visual values.

.3 CHAMBER TYPE B

- .1 Range: During full ventilation mode (with max ambient temperature of 30°C), chambers must operate with a minimum temperature range of 4°C to 44°C with lights off and 10°C to 44°C with lights on.
- .2 Chambers must be able to control temperature to within $\pm 0.5^\circ\text{C}$ of set point.
- .3 Must provide a programmable minimum and maximum temperature safety limits that automatically follows the programmed set point.
- .4 Must ensure an audible alarm is provided for all temperature safety limits.
- .5 Must provide a vertically adjustable sensing device located in the growth area to ensure growth area air is continuously drawn over the sensors for accurate controlling and recording at plant location.
- .6 Cooling/Refrigeration System:
 - .1 Chambers must be equipped with a water cooled, hermetically sealed, hot gas bypass condensing unit. All growth chambers must be connected to the site's constant flow process water cooling system supply and return system. Supply process water temperature is 25 °C.
 - .2 Condensing unit must include 3 way water valve and hand operated shut off bypass valve.
 - .3 Condensing unit must be easily accessible and located in machine compartment within the maximum equipment dimensions defined in this document.
 - .4 Chamber must have an electromagnetic 3 way proportional valve that smoothly modulates heating and cooling.
 - .5 Refrigeration system must be charged with CFC-free refrigerant.
 - .6 Evaporative coil must be copper-tube construction and phenolic coated.
 - .7 Monitoring: High and low pressure transducers must be provided for real time monitoring of the condition of the refrigeration system. Control systems must be able to log and alarm high/low pressure exceedances of user specified alarm values.

.4 CHAMBER TYPE C

- .1 Range: During full ventilation mode (with max ambient temperature of 30°C), chambers must operate with a minimum temperature range of 4°C to 40°C with lights off and 10°C to 44°C with lights on.
- .2 Chambers must be able to control temperature to within $\pm 0.5^\circ\text{C}$ of set point.
- .3 Must provide a programmable minimum and maximum temperature limits as well as factory set temperature safety limit which turns off chamber when reached.
- .4 Cooling/Refrigeration System:
 - .1 Chambers must be equipped with a top mounted, water cooled, hermetically sealed, hot gas bypass condensing unit. All growth chambers must be connected to the site's constant

flow process water cooling system supply and return system. Supply process water temperature is 25 °C.

- .2 Condensing unit must include 3 way water valve and hand operated shut off bypass valve.
- .3 Condensing unit must be easily accessible and located within the maximum equipment dimensions defined in this document.
- .4 Chamber must have an electromagnetic modulating valve that smoothly modulates heating and cooling within the chamber.
- .5 Refrigeration system must be charged with CFC-free refrigerant.
- .6 Evaporative coil must be copper-tube construction and phenolic coated.

1.7 HUMIDITY

.1 CHAMBER TYPE A AND TYPE B

- .1 Must be equipped with spray nozzle humidification and dehumidification using cooling coils and re-heat heaters. Humidification/dehumidification set point must be programmable with control system.
- .2 Humidification system must operate with Owner's reverse osmosis (RO) water supply. Existing RO supply pressure is 30psi.
- .3 Must provide additive humidity to achieve up to 90% Relative Humidity (RH) with lights off and 85% RH with lights on, limited by a 25 °C maximum dew point. Assume 21°C, 50% RH ambient air.
- .4 Must ensure humidity control is within $\pm 3\%$ RH and system must incorporate a dry humidity sensor located in an appropriate device for sensing, measuring and controlling.
- .5 Must provide a separate de-humidification coil to allow reduction in humidity to at least 40% RH at 25C.

.2 CHAMBER TYPE C

- .1 Humidification set point must be programmable with control system.
- .2 Humidification system must operate with Owner's reverse osmosis (RO) water supply. Existing RO supply pressure is 30psi.
- .3 Must provide additive humidity to achieve up to 90% Relative Humidity (RH) with lights off and 75% RH with lights on, limited by a 25 °C maximum dew point. Assume 21°C, 50% RH ambient air.
- .4 Must ensure humidity control is within $\pm 6\%$ RH and system must incorporate a dry humidity sensor to directly measuring relative humidity.

1.8 VENTILATION

.1 CHAMBER TYPE A

- .1 Must be distributed uniformly within growth area.
- .2 Growth area floor must be constructed of removable, aluminium or stainless steel perforated panels allowing conditioned air movement in a vertical direction through the plants.

- .3 Air flow speed to be adjustable and programmable from a low speed to a maximum of 50ft/min.
- .4 Fresh air control must have individual manual adjustment of fresh air inlet and outlet from fully open (providing 15 air changes per hour) to fully closed.

.2 CHAMBER TYPE B

- .1 Must be distributed uniformly within growth area.
- .2 Growth area floor must be constructed of removable, aluminium or stainless steel perforated panels allowing conditioned air movement in a vertical direction through the plants.
- .3 Air flow speed to be adjustable and programmable from a low speed to a maximum of 45ft/min.
- .4 Fresh air control must have individual manual adjustment of fresh air inlet and outlet from fully open (providing 15 air changes per hour) to fully closed.

.3 CHAMBER TYPE C

- .1 Fresh air must be manual adjustable and distributed uniformly across both growth areas.
- .2 Air movement speed in growth area must be adjustable.

1.9 INSTRUMENTATION PORTS

.1 CHAMBER TYPE A AND B

- .1 Each growth chamber must be equipped with at least two (2), 1" diameter or greater port with light tight cap.

.2 CHAMBER TYPE C

- .1 Each growth chamber must be equipped with at least one (1), 1" diameter or greater port with light tight cap.

1.10 RECEPTACLES

.1 CHAMBER TYPE A AND B

- .1 Each growth chamber must be equipped with at least one (1), internally mounted 120V AC duplex receptacles, rated and protected for damp locations and wired with overload protection.

1.11 WATERING SYSTEM

.1 CHAMBER TYPE A AND B

- .1 Each chamber must be equipped with a hose bib and connected to the control system for timed control of automatic watering.

1.12 UTILITY REQUIREMENTS

.1 Electrical:

- .1 Electrical service available at the site is 60Hz, 120/208 – 3phase – 4 wire plus ground. 20A and 30 A circuits are available. All chambers must be able to operate with this service.

- .2 Contractor is responsible for all electrical connections to all chambers.
- .2 Chill water:
 - .1 Growth chambers must be designed for water cooling of condensing unit. 25°C processing cooling water is available at site. Contractor must ensure this is compatible with the chamber refrigeration systems.
 - .2 Supply and return process cooling water piping connection will be available within 1m of each of the intended new growth chamber locations.
 - .3 Contractor is responsible for all connections to cooling water supply and returns for all chambers.
- .3 Drain:
 - .1 Existing floor drains are a maximum of 1 m away from each of the intended new chamber locations.
 - .2 Contractor must install copper drain lines from each chamber in contract to floor drains.
- .4 RO Water:
 - .1 Humidification systems for all chambers must operate with Owner's RO water supply. Existing RO supply pressure is 30psi and is available within 1m of each of the intended new growth chamber locations. Contractor must ensure this is adequate for all chamber humidification systems.
 - .2 Contractor is responsible for all connections to RO water supply for all new chambers.

1.13 CONTROL SYSTEM REQUIREMENTS

- .1 General
 - .1 Existing system at the site is comprised of dedicated network of field controllers located in individual controlled environment zones. All controllers are managed through a PC server providing primary operator interface, monitoring, programming individual controlled environment zone parameters and schedules, data archiving, backup of all configuration and settings, etc. The intent of this project is to maintain this setup and add the chambers and controllers supplied under this contract to this existing network.
 - .2 Existing system is Argus Titan system v1 build 00718.006. All components and software supplied under this contract must be compatible with this system to allow seamless integration and operation as a single networked system.
 - .3 The control system must be designed specifically for agricultural and entomological research use with all equipment and enclosures suitably designed for the climate conditions of these applications.
 - .4 The control system and components must be up to date and latest versions at time of contract award.
 - .5 Electrical protection. Each major component in the system must contain:
 - .1 Protection for each power and communications connection against electrical surge and transient damage.
 - .2 Protection for all control outputs against contact arcing damage, as well as electrical surge and transient damage.
 - .3 Electrical isolation for each major system component to prevent ground loops.

-
- .6 Controllers and I/O modules must be simple 'plug-in' type so replacement can be done by non-technical staff in emergency situations. All other major system components (network repeaters, network power supplies) must be similarly easy to replace by non-technical staff.
 - .7 Control system architecture design to limit the impact on overall network of a component failure (ex: a component failure should be limited to impact at most, a single chamber).
 - .8 The control system must be supplied fully configured for the stated application. Manufacturer support must be provided for system commissioning, and control system adjustments as necessary for at least one (1) year.
- .2 Control Features
- .1 Control system must provide monitoring and control applications design specifically for management of agricultural and entomological bio-climates.
 - .2 Automated control applications must include capability for user to create and change safety limits, overrides, and custom programming rules and schedules.
 - .3 Must provide at a minimum, automated control of chamber temperature, ventilation, humidity, and irrigation.
 - .4 Monitoring, data logging and storage:
 - .1 For each individual chamber, system must provide continuous monitoring, logging and storage of all chamber environmental variables, readings, settings and controls statuses, and alarms.
 - .2 Data recording sample rate for each recordable point must be a maximum of one (1) second.
 - .3 Must display an overlay of any logged or real time captured variable over another.
 - .4 System must allow a feature to easily export logged data to common data files formats such as Excel.
 - .5 Controllers must be able to store and buffer recorded data and automatically back-up data to PC Server for retrieval and display in a graphical user interface. PC server will store data from all controllers on local hard drives.
 - .5 Alarms:
 - .1 User must be able to develop and configure limit alarm conditions. Multiple configurable limit conditions must be able to be linked together to create more complex multi-condition alarms.
 - .2 User must be able to assign a minimum of three (3) alarm distinct levels based relative severity of the alarm.
 - .6 Must allow user to create daily programs which can be linked and sequenced together to simulate multi-day or seasonal programs.
- .3 Operator Interface
- .1 Existing Argus Titan system at site must be expanded and/or modified as necessary to provide the following:
 - .1 Full graphical user interface that can be easily modified and/or expanded by user without resorting to 3rd party service providers. All user settings and system configuration settings are viewed and changed through the software interface. For each chamber, users can:
 - .1 Monitor all control points.

-
- .2 Add, edit, or delete control points and system database.
 - .3 Modify control logic and sequences of operation.
 - .4 Edit all user parameter labels.
 - .5 Set and edit timing parameters, data acquisition and storage parameters.
 - .6 Create and modify programmed start/stop schedules.
 - .7 View and respond to alarms and associate messages.
 - .8 Upload or download program updates, system and configuration backups, and logged databases.
 - .9 Create and modify graphic interface screen designs including static and dynamic display objects, control processes, status displays, and any combination of 'live' parameters.
- .2 Interface must provide means for user to easily search and filter archived data to present information in a clear tabular and graphical way. This includes ability to overlay any combination of recorded parameters on same graph. User must be able to zoom and pan the graphed data presentation and be able to export filtered data into common data file formats included Microsoft Excel.
 - .3 Must provide a thorough on screen help manual.
- .4 Controllers:
 - .1 Must be equipped with real-time clocks designed for real-time equipment control, memory backup, and ability to self-restart and resume full functionality after power interruption.
 - .2 Must support Ethernet connection.
 - .3 Must support serial connection to Modbus RTU devices.
 - .4 Must monitor all direct inputs and adjust all outputs at least once per second. This refresh rate shall not degrade as the system expands.
 - .5 Must support a minimum of 32 I/O modules.
- .5 I/O Modules:
 - .1 I/O network must have ability to be expandable through the addition of optional signal repeaters.
 - .2 Power supply must be regulated, protected, and filtered for all control equipment connected to I/O network.
 - .3 I/O network segments must automatically restart and resume full functionality after power interruption.
 - .4 Each I/O module must be electrically isolated to prevent ground loops.
 - .5 Inputs:
 - .1 Both analog and digital input channels must be provided.
 - .2 Each input channel must be programmable to support a range of sensor types.
 - .3 Input current type (AC or DC) must be user switchable.
 - .4 Climate monitoring must include air temperature, humidity, PAR light and optional CO₂ levels.
 - .6 Outputs:

- .1 Must be fully configurable and individually addressable.
 - .2 Must be dry contact or Class 2 low voltage.
 - .3 Must allow for both digital and analog outputs. Digital outputs must have indicator lights to denote control status and manual overrides for testing and emergency operation.
- .6 Local Display Interface
- .1 Each chamber must be equipped with a local LCD digital display of critical sensor measurements (temperature, humidity, PAR lighting) and control status.
 - .2 Local display must be mounted on exterior of chamber in a convenient location to allow operator to read values without having to open chamber door.
- .7 Cabling
- .1 To meet NEC Type CM/CL3, UL or ULC, 300V requirements as specified in NEC, UL 1685 flame rating.
 - .2 The chambers must be supplied and installed in two (2) separate rooms. Their distances from the nearest panel for connection to the existing Argus system are as follows:
 - .1 Door to Room 161 is located approximately 24m from master Argus panel and on same floor.
 - .2 Door to Room 014 is located approximately 48m the master Argus panel and on the floor below

END OF SECTION

ANNEX A2
INSTALLATION REQUIREMENTS

1.0 GENERAL

- .1 Contractor must examine the site and be knowledgeable with existing site conditions likely to affect work.
- .2 Contractor to locate and install new growth chamber units in locations and orientations shown in Drawing M2.1. Contractor to supply and install the chambers with the door swing directions (chamber and maintenance doors) shown, as well as with the mechanical/electrical services located on the correct side of chambers as shown.
- .3 Contractor to connect and install all services to new growth chambers including electrical power for all chamber components and controls, chill water cooling, drain line, RO water for humidification, controllers and communication cabling for connection to Owner's Argus front end system.
- .4 Contractor to route all communication cabling on existing cable trays, cable hangers and cable runs as much as possible.
- .5 Contractor will un-crate equipment and be responsible for dispose of crating material.
- .6 Contractor will assemble and perform all installation, testing and commissioning work of all supplied equipment and systems using factory trained, qualified personnel.
- .7 Contractor will start-up and check equipment performance and operation to factory specifications.

1.1 COMMISSIONING

- .1 Contractor must submit Performance Verification (PV) forms to be used for all testing and commissioning for each chamber. The intent is to confirm all elements of performance successfully function in accordance with the Contract documents and design intent. This includes functionality of full system, from software control at PC server end to chamber unit itself.
- .2 Departmental Representative to review and approve forms prior to commencement of testing and commissioning.
- .3 Contractor must perform a 24 hour test to demonstrate performance of all controlled parameters to their specified limits. Details of test must be submitted to Departmental Representative for approval prior to conducting the test.
- .4 Contractor must provide all completed testing documents and records and provide a documented operator training program.
- .5 Should equipment, system components, software and associated control be incorrectly installed or malfunction during commissioning, the Contractor must correct any deficiencies, and re-verify item and its proper integration in full system.

1.2 DEMONSTRATION AND TRAINING

- .1 Contractor must provide documented operator training program to Departmental Representative for acceptance prior to commencement of training.
- .2 Complete user training and full instruction on use of supplied equipment and systems must be provided onsite for research staff, support staff, and maintenance personnel.

- .3 Training must be delivered after commissioning is completed and submitted O&M manuals are deemed sufficiently complete by Departmental Representative.
- .4 Demonstration and training include:
 - .1 Demonstration of start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment and agreed upon times, at equipment location.
 - .2 Instruction of personnel in phases of operation and maintenance must be delivered using operation and maintenance manuals as basis of instruction.
 - .3 Review of contents of the manual in detail to explain aspects of operation and maintenance.
- .5 Contractor must allow for one (1) full day of training on growth chamber equipment and one (1) full day of training on software interface.

1.3 CLEANING AND ADJUSTING

- .1 Upon completion of the Work, the Contractor must:
 - .1 Perform a final cleaning of equipment and apparatus, removing dust, stains, spots, marks and dirt.
 - .2 Inspect finishes, fitments and fixtures, and ensure quality of workmanship and operation.
 - .3 Remove protective coverings.
 - .4 Re-finish any damaged coatings and finishes.
 - .5 Remove any dents. All elements of the equipment must be in new condition when turned over to Owner.

END OF SECTION

ANNEX A3
GENERAL INSTRUCTIONS

1.0 DEFINITIONS

- .1 Supply: to acquire or purchase ship or transport to the site, unload, remove packaging to permit inspection for damage, re-package, replace damaged items, and safely store on-site.
- .2 Install: to receive at site, to transport to intended location within building, install in position, connect to utilities, repair any damage caused, replace if necessary, commission and make ready for use.
- .3 Provide: to supply and install.
- .4 Owner or Departmental Representative: AAFC project manager, AAFC site manager, or agent operating on AAFC's behalf including Consultant.
- .5 Contractor: the construction contractor hired by AAFC to complete the work identified in the contract drawings and specifications.

1.1 WORK COVERED BY CONTRACT DOCUMENTS:

- .1 Supply and install sixteen (16) standard production model controlled environment growth chambers. Quantities of each chamber type to be supplied and installed under this contract are as follows:
 - a. Four (4) Chamber Type A
 - b. Eight (8) Chamber Type B
 - c. Four (4) Chamber Type C
- .2 Contractor must make all services connection (power, cooling water, RO water, drain, data communications) and must fully commission all units for client use.
- .3 Contractor must test and commission all chambers and provide training to AAFC staff on all maintenance items associated with all products provided under this contract as well as user operation, programming and control of the system as a whole.

1.2 OWNER OCCUPANCY / WORK SEQUENCE

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Construct Work in stages to accommodate Owner's continued use of premises during construction.
- .3 Co-ordinate progress schedule and co-ordinate with Owner Occupancy during construction.
- .4 Maintain fire access/control.

1.3 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, for storage, for access, to allow Owner occupancy.
- .2 Co-ordinate use of premises under direction of Departmental Representative.

- .3 At completion of operations condition of existing site: equal to or better than that which existed before new work started.
- .4 Contractor must become thoroughly familiar with and abide by all provisions and requirements of the London Research and Development Centre's health and safety, security and fire safety plans.
- .5 No smoking in or near any AAFC buildings.
- .6 Submit schedule to and obtain approval from Owner for any shutdown or closure of active service or facility including roadway, power, water, natural gas, security and communications services. Adhere to approved schedule and provide notice to affected parties.
- .7 All work which generates excessive noise, vibrations and odours must be executed outside of normal business hours (Monday to Friday 8am to 5pm). Work to be carried out outside of operating hours must be scheduled at least one (1) week in advance with the Departmental Representative.

1.4 EXISTING SERVICES

- .1 Where unknown services are encountered, immediately advise Owner and confirm findings in writing.

1.5 PROJECT MEETINGS

- .1 Within five (5) calendar days after award of contract, the AAFC Project Manager will schedule a kick-off meeting. Progress meetings will be bi-weekly thereafter, except during material delivery period where meetings will be held only on an as needed basis.
- .2 Meetings to be by teleconference. AAFC will pay for and arrange teleconferencing facilities for these meetings.
- .3 Contractor's project manager must be in attendance at each meeting.
- .4 Contractor to schedule and chair project meetings throughout progress of work. Contractor will prepare and distribute agenda and minutes for each meeting. Minutes to include significant proceedings and decisions with action items identified with responsible parties and deadline. Minutes must be distributed within two (2) working days after meeting.
- .5 Prior to each meeting, Contractor will provide project team with detailed progress report and updated schedule.

1.6 SCHEDULE

- .1 Within seven (7) calendar days after the Contractor has been advised in writing of the acceptance of his tender, he must furnish the AAFC Project Manager with a proposed schedule detailing all construction activities (including product ordering and delivery) and forecasted start and end dates for each.
- .2 The Contractor will maintain and update the project schedule continually, or changes are foreseen to or actually occur, throughout the duration of the project and will have it available to Owner at any time.
- .3 When proposed changes are envisioned, the Contractor shall immediately advise the AAFC Project Manager of these changes.

1.7 ON-SITE DOCUMENTS

- .1 Maintain at job site, a copy of the following:
 - .1 Specifications.
 - .2 Amendments.
 - .3 Reviewed shop drawings.
 - .4 Change orders.
 - .5 Field test reports.
 - .6 Approved Work schedule.
 - .7 Manufacturers' installation and application instructions.
 - .8 Material Safety Data Sheets.
 - .9 All applicable Municipal Permits.

1.8 PERMITS, LICENCES, REGULATIONS AND ACTS

- .1 All work, products and methods provided by the Contractor must comply with the most recent versions of applicable Municipal, Provincial Government and Government of Canada regulations including but not limited to:
 - .1 National Building Code of Canada
 - .2 National Fire Code
 - .3 Ontario Building Code
- .2 The Contractor shall comply with all Workers' Compensation Board regulations as they apply to the work of this contract.
- .3 The Contractor shall be responsible for obtaining and paying for all permits or licenses that are required for completion of the Contract.
- .4 Furnish all related certificates to the Owner at completion of the contract as evidence of a complete and proper installation.
- .5 Contractor to pay all fees to obtain permits.

1.9 DELIVERY, STORAGE, HANDLING

- .1 Material Delivery Schedule: Provide AAFC Project Manager with schedule within seven (7) calendar days after award of Contract.
- .2 The Contractor will be permitted to use only those areas on site which have been designated by the Owner for equipment or construction areas.
- .3 Contractor to receive and unload all equipment and material. AAFC cannot receive or unload any deliveries on Contractor's behalf.
- .4 There is no indoor or exterior sheltered storage space available at the site. Any sheltered storage space needed by Contractor must be provided by Contractor.

END OF SECTION

1.0 ADMINISTRATIVE

- .1 Submit to AAFC Project Manager submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Verify field measurements and affected adjacent Work are co-ordinated.
- .4 Contractor's responsibility for errors and omissions in submission is not relieved by Consultants' review of submittals.
- .5 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by AAFC Project Manager review.

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means manufacturer product data sheets (ex: brochures, drawings, diagrams, illustrations, schedules, performance charts, and other data).
- .2 Contractor must submit these promptly, completely and in an orderly sequence to not cause delay in the Work. Failure to submit in ample time is not considered sufficient reason for the extension of contract deadline.
- .3 Indicate materials, and where appropriate, methods of construction and attachment or anchorage, erection diagrams, connections.
- .4 Contractor must notify Departmental Representative in writing at time of submission, identifying deviations from the requirements of the Contract Documents and stating reasons for these deviations.
- .5 Contractor must verify that field measurements and affected adjacent work or coordinated.
- .6 Adjustments made on shop drawings by AAFC are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to AAFC Project Manager prior to proceeding with Work.
- .7 If upon review by the AAFC Project Manager, no errors or omissions are discovered or if only minor corrections are made, scanned electronic copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .8 The review of shop drawings by the AAFC Project Manager is for the purpose of ascertaining conformance with general design concept.
 - .1 This review shall not mean that AAFC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

END OF SECTION

1.0 GENERAL

- .1 The Contractor shall use due care and take all necessary precautions to ensure the protection of persons and property and shall comply with the most current requirements of the applicable federal and provincial government agencies including but not limited to:
 - .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations
 - .2 Province of Ontario Occupational Health and Safety Act
 - .3 Worker Safety and Insurance Board.
- .2 All training and safety equipment acquisition, transportation and maintenance is the responsibility of the Contractor.
- .3 The Contractor shall have a site specific safety management plan prior to mobilizing to site. This plan shall include provisions to ensure the safety of the public, those engaged in the work under this contract, and those employed by other agencies or contractors who may require access to the site against accident and injury. The Contractor shall post on site all necessary and applicable signs regarding safety hazards, and the required personal safety equipment.
- .4 The Contractor shall supply and maintain at all times suitable lock-out devices, barricades and signs as are necessary to ensure the safety of the public, those engaged in the work under this contract, and AAFC employees against accident and injury.
- .5 Notwithstanding the provisions of the General Conditions, in any emergency affecting the safety of life, or of the work, or of adjoining property, the Contractor, without direction from the AAFC, shall act in a reasonable manner to prevent loss or injury.

END OF SECTION

1.0 QUALITY CONTROL

- .1 If the Contractor covers or permits to be covered any work that is subject to inspection or before any special tests and approvals are completed without the approval of the Departmental Representative, the Contractor shall uncover the work, have the inspections satisfactorily completed and make good the work at his own expense.
- .2 Costs for additional review, inspection, and or testing made necessary for certification of payment by need to correct defective and non-conforming work to be by Contractor.
- .3 Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

1.1 INSPECTION AND TESTS OF MATERIALS

- .1 All materials furnished and all work performed will be subject to inspection. The Contractor must demonstrate to the AAFC Representative and Consultant that all components are suitable and satisfactory for their intended purpose.

1.2 DEFECTIVE MATERIALS AND EQUIPMENT

- .1 Defects disclosed prior to acceptance:
 - .1 Defects or other failure to meet the requirements of the contract, including errors or omissions on the part of the Contractor, which are disclosed prior to final acceptance, shall be corrected entirely at the expense of the Contractor, including cost of required tests of corrected defects.
- .2 Defects disclosed after acceptance:
 - .1 Latent defects not disclosed before the date of final acceptance, but disclosed within two (2) years (unless otherwise stated in the contract documents) from date of the Substantial Completion must be corrected promptly by the Contractor entirely at the expense of the Contractor.

1.3 QUALITY ASSURANCE

- .1 Manufacturer must ensure a Nationally Recognized quality program, such as ISO9001, is used in the order, design and manufacturing processes of the growth chambers as well as all supplied product. Proof of quality assurance program certification will be requested.
- .2 Standard production model controlled environment chambers will mean chambers manufactured as a model line, sold and supported by the manufacturer with original equipment manufacturers parts, skilled repair technicians covered by a two (2) year warranty coverage. Prototype or "one of a kind" controlled environment growth chambers are not acceptable.
- .3 The Contractor must ensure that all equipment supplied is manufactured and installed by a company having personnel skilled in the manufacture and installation of plant growth chambers.

1.4 CERTIFICATIONS

- .1 All electrical equipment supplied under the Contract must be certified or approved for use in accordance with the Canadian Electrical Code, Part 1, **before delivery**, by a certified organization accredited by the Standards Council of Canada.

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- .2 Any onsite inspections required by the local Electrical Safety Authority (ESA), will be the responsibility of the Contractor supplying the new growth chambers. The Contractor will schedule, supply all electrical drawings and electrical component details and pay for all costs associated with any inspection required by the ESA.
- .3 All chambers must be provided with product certification to CSA (Canadian Standards Association) and/or ULC (Underwriters Laboratories of Canada). Proof of product certification must be provided.

END OF SECTION

1.0 OPERATIONS AND MAINTENANCE MANUALS

- .1 Submit to AAFC a hard and soft copy of approved Operations Data and Maintenance Manual, compiled as follows:
 - .1 Hard copy must be provided in hard cover binder.
 - .2 Enclose title sheet labelled "Operation Data and Maintenance Manual," project name, date and list of contents. Project name must appear on binder face.
 - .3 Soft copy must be in single file, PDF format.
- .2 Include following information plus data specified:
 - .1 Operational data including:
 - .1 Description of the equipment and systems.
 - .2 Description of operation of the equipment and systems at all modes of use.
 - .3 Operation instructions for equipment, components, and systems.
 - .4 Description of the actions must be taken in the event of equipment failure.
 - .2 Maintenance and cleaning instructions including:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for all equipment and systems.
 - .2 Data to include schedule of tasks, frequency, tools required and take time.
 - .3 Description of specialities and accessories, giving the manufacturer's name, the type, model, year, capacity, and list of recommended spare parts.
 - .3 Manufacturer and suppliers names, addresses and telephone numbers and components supplied by them must be included in this section. Components must be identified by a description and manufacturers part number.
 - .4 All approved shop drawings.
- .3 Warrantees and Guarantees showing:
 - .1 Name and address of projects.
 - .2 Guarantee commencement date (date of Interim Certificate of Completion) and duration.
 - .3 Clear indication of what is included and excluded in guarantee.
- .4 Include one complete set of final shop drawings indicating corrections and changes made during fabrication and installation (clear hand mark is sufficient).
- .5 All commissioning and start-up sheets or checklists.
- .6 All testing and inspection reports.

END OF SECTION

APPENDIX 1

1.0 REFERENCES

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME).
 - .1 ANSI/ASME B16.26-[2001], Cast Copper Alloy Fittings for Flared Copper Tubes.
 - .2 ANSI/ASME B16.29-[2001], Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings – DWV.
- .2 American National Standards Institute/National Fire Protection Association (ANSI/NFPA).
 - .1 ANSI/NFPA - 255- [2000], Standard Method of Test of Surface Burning Characteristics of Building Materials.
- .3 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 167-99 (2009) Standard Specification for Stainless and Heat Resistant Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM A 240/A 240M-15a Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Applications.
 - .3 ASTM A 480/A 480M-14b Specification for General Requirements for Flat-Rolled Stainless and Heat-Resistant Steel Plate, Sheet and Strip. Finish for sheet: No. 4 Finish-General purpose polished finish, one of both sides.
 - .4 ASTM A 653/A 653M-09 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip process.
 - .5 ASTM B 88M-05, Standard Specification for Seamless Copper Water Tube [Metric].
 - .6 ASTM B 280-13, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
 - .7 ASTM E 84-15a, Standard Test Method for Surface Burning Characteristics of Building Materials.
 - .8 ASTM E 162-13, Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13-M87, Sealing Compound One-Component, Elastomeric, Chemical Curing.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA C22.2 No. 137-M1981(R2014), Electric Luminaires for Use in Hazardous Locations
- .6 Underwriters' Laboratories of Canada
 - .1 CAN/ULC-S704-2011, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
 - .2 CAN/ULC-S705.1-2011, Thermal Insulation – Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.

END OF SECTION