

**RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:**
**Bid Receiving Public Works and Government
Services Canada/Réception des soumissions
Travaux publics et Services gouvernementaux
Canada**
**800 Burrard Street, Room 219
800, rue Burrard, pièce 219
Vancouver, BC V6Z 0B9**

**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 New Growth Chambers at PARC Summerl	
Solicitation No. - N° de l'invitation EZ899-160422/A	Date 2015-09-09
Client Reference No. - N° de référence du client EZ899-160422	
GETS Reference No. - N° de référence de SEAG PW-\$VAN-584-7614	
File No. - N° de dossier VAN-5-38086 (584)	CCC No./N° CCC - FMS No./N° VME
Solicitation Closes - L'invitation prend fin at - à 02:00 PM on - le 2015-10-20	
Time Zone Fuseau horaire Pacific Daylight Saving Time PDT	
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: Perez, Elizabeth	
Buyer Id - Id de l'acheteur van584	
Telephone No. - N° de téléphone (604) 775-7690 ()	FAX No. - N° de FAX () -
Destination - of Goods, Services, and Construction: Destination - des biens, services et construction: PWGSC/TPSGC 800 Burrard Street Vancouver BC V6Z 0B9	

Instructions: See Herein

Instructions: Voir aux présentes

Vendor/Firm Name and Address

**Raison sociale et adresse du
fournisseur/de l'entrepreneur**

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

Issuing Office - Bureau de distribution

Public Works and Government Services Canada - Pacific
Region
219 - 800 Burrard Street
800, rue Burrard, pièce 219
Vancouver, BC V6Z 0B9

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van584

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File No. - N° du dossier

VAN-5-38086

CCC No./N° CCC - FMS No/ N° VME

TITLE: NEW GROWTH CHAMBERS

See attached.

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PART 1 - GENERAL INFORMATION

1.1 Introduction

The bid solicitation is divided into seven parts plus attachments and annexes, as follows:

- Part 1 General Information: provides a general description of the requirement;
- Part 2 Bidder Instructions: provides the instructions, clauses and conditions applicable to the bid solicitation;
- Part 3 Bid Preparation Instructions: provides bidders with instructions on how to prepare their bid;
- Part 4 Evaluation Procedures and Basis of Selection: indicates how the evaluation will be conducted, the evaluation criteria that must be addressed in the bid, and the basis of selection;
- Part 5 Certifications: includes the certifications to be provided;
- Part 6 Security, Financial and Other Requirements: includes specific requirements that must be addressed by bidders; and
- Part 7 Resulting Contract Clauses: includes the clauses and conditions that will apply to any resulting contract.

The Annexes include the Requirement, the Basis of Payment, the Federal Contractors Program for Employment Equity - Certification, and any other annexes.

1.2 Summary

1.2.1 Requirement

Public Works and Government Services Canada (PWGSC) Real Property Services/Professional Technical Services (RPS/PTS) Pacific Region on behalf of its Client – Agriculture and Agri-Food Canada (AAFC) has a requirement for the supply, delivery, fabrication, installation and commissioning of New Growth Chambers at Level 2 of the Pacific Agri-Food Research Centre (PARC) at Summerland, B.C.

The installation and commissioning of the growth chambers will be done in co-operation with the Infrastructure Contractor. The intent of the design is to replace existing chambers with new growth chambers of a variety of sizes and capacity to facilitate scientific experiments that range in sizes and scale.

The current plan is to procure 10 growth chambers (**quantities of 4 for Type 3, quantities of 2 for Type 4, quantities of 3 for Type 5 and quantity of 1 for Type 6**) at the initial stage. The site and infrastructure will be constructed with sufficient capacity for potential future acquisition of chambers (quantities of 7 for Type 1, quantities of 2 for Type 2 and additional quantities of 4 for Type 3) which, may be acquired subject to funding availability.

All chambers are intended for research purposes and must be designed and manufactured to be compatible with microbial, plant and insect research.

All deliverable materials for the initial order of Growth Chambers must be received at the destination site on or before March 31, 2016.

All Growth Chambers for the initial order must be fabricated to specifications, installed, commissioned and tested to full working capacity on or before June 30, 2016.

Complete user training and full instructions on use of supplied equipment and systems must be provided on site at the Agriculture and Agri-Food Canada (AAFC) - Pacific Agri-Food Research Centre (PARC) at Summerland, B.C for research staff, support staff and maintenance personnel (estimated 12 people) upon request of the Departmental Representative, within thirty (30) working days after the Commissioning of the equipment.

1.2.2 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 Agreement on Internal Trade (AIT)."

1.2.3 There is an optional site visit associated with this requirement. Consult Part 2 – Bidder Instructions.

1.2.4 The Federal Contractors Program (FCP) for employment equity applies to this procurement; see Part 5 - Certifications, Part 7 - Resulting Contract Clauses and the annex titled [Federal Contractors Program for Employment Equity - Certification](#)."

1.3 Debriefings

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

PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the *Standard Acquisition Clauses and Conditions Manual* (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) 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 (2015-07-03) 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: 120 days

2.2 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.

Due to the nature of the bid solicitation, bids transmitted by facsimile to PWGSC will not be accepted.

2.3 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority **no later than Fourteen (14) calendar days before the bid closing date.** Enquiries received after that time may not be answered.

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

2.4 Applicable Laws

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

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

2.5 Optional Site Visit

It is recommended that the Bidder or a representative of the Bidder visit the work site. Arrangements have been made for the site visit to be held at **Agriculture and Agri-Food Canada (AAFC), Pacific Agri-Food Research Centre at 4200 97 Highway, Summerland, B.C. on Wednesday September 16, 2015. The site visit will begin at 10:30 AM.**

Bidders are requested to report and sign an attendance sheet at the Reception Security Area before the 10:30 AM site visit and must bring a piece of picture identification.

Bidders are requested to communicate with the Contracting Authority no later **than three (3) business days** (Thursday, September 3rd) to confirm attendance and provide the name(s) of the person(s) who will attend.

Bidders who do not attend or do not send a representative will not be given an alternative appointment but they will not be precluded from submitting a bid. Any clarifications or changes to the bid solicitation resulting from the site visit will be included as an amendment to the bid solicitation.

2.6 Request for Drawings and Photos

A-00 Cover Sheet
A-02 Floor Plan – New Work
A-03 Sections – New Work

Drawings and photographs of the AAFC Summerland site are available upon request. It is recommended that the Bidder contact the Contracting Authority named at article 7.5.1 of this solicitation for details of where this information can be downloaded.

PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

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

Section I:	Management Bid	(5 hard copies + 2 soft copies)
Section II:	Technical Bid	(5 hard copies + 2 soft copies)
Section III:	Financial Bid	(1 hard copy)
Section IV:	Certifications	(1 hard copy)
Section V:	Additional Information - Technical Brochures (5 hard copies)	

If there is a discrepancy between the wording of the soft copy and the hard copy, the wording of the hard copy will have priority over the wording of the soft 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: Management Bid

In their Management Bid, it is requested that bidders provide general information about their capacity to meet certain requirements of the bid solicitation. They are also requested to describe their capability and experience, their project management team and provide reference projects client contact(s). It is requested that bidders **use Submission Forms 1 and 2** to provide base information about the Bidder and information that will be evaluated to assess the capacity of the Bidder.

(1) Submission Form 1 – Bidder Information:

Bidders are requested to include the Bidder Information form with their bids. It provides a common form in which bidders can provide information required for evaluation and contract award, such as a contact name, the Bidder's Procurement Business Number, the Bidder's status under the Federal Contractors Program for Employment Equity, and the Bidders list of their current Board of Directors. Using the form to provide this information is not mandatory, but it is recommended. If Canada determines that the information required by the Bid Submission Form is incomplete or requires correction, Canada will provide the Bidder with an opportunity to do so.

(2) Submission Form 2 - Substantiation of Bidder's Qualifications

It is requested that bidders use the Submission Form 2 to provide to the evaluation team information that will be evaluated to determine whether the bidder has the capacity to meet this requirement. It collects information about the company location, size, and management structure as well as about their experience in fabricating and providing growth chambers for agricultural research.

Section II: Technical Bid

In their technical bid, bidders should demonstrate their understanding of the requirements contained in the bid solicitation and explain how they will meet these requirements. Bidders should demonstrate their capability in a thorough, concise and clear manner for carrying out the work.

The technical bid should address clearly and in sufficient depth the points that are subject to the evaluation criteria against which the bid will be evaluated. Simply repeating the statement contained in the bid solicitation is not sufficient. In order to facilitate the evaluation of the bid, Canada requests that bidders address and present topics in the order of the evaluation criteria under the same headings. To avoid duplication, bidders may refer to different sections of their bids by identifying the specific paragraph and page number where the subject topic has already been addressed.

Bidders must submit documentation with their bid package that clearly and precisely demonstrates how their product and system complies with the required specifications.

The technical bid must consist of the following:

(1) Substantiation of Technical Compliance (Mandatory and Point Rated Items):

The technical bid must substantiate the compliance of the Bidder and its proposed product with the specific articles of **Annex A1 (Technical Specifications)**. **It is requested that bidders use Submission Form 3: Substantiation of Technical Compliance (Mandatory and Point Rated Items)** to provide the substantiation. This form, using Annex A1 as a base, has been formatted specifically to prompt the bidder to provide the appropriate response for each item, which could be either confirmation (and substantiation) of compliance to Mandatory items or a description of the details of compliance for Point Rated evaluation, OR BOTH.

(2) Supporting Documentation:

The substantiation may refer to additional technical and descriptive documentation submitted with the bid. The specific location of this supporting documentation should be referenced in the "Reference in Supporting Documentation" column of the Substantiation of Technical Compliance form, where bidders are requested to indicate where in the bid the reference material can be found, including the title of the document, and the page and paragraph numbers. Where the reference is not sufficiently precise, Canada may request that the Bidder direct Canada to the appropriate location in the documentation. As noted in article 05 of the Standard Instructions, Canada will evaluate only the documentation provided with a bidder's bid. Canada will not evaluate information such as references to Web site addresses where additional information can be found, or technical manuals or brochures not submitted with the bid. Where Canada determines that the substantiation is not complete for Mandatory items, the Bidder will be considered non-responsive and disqualified.

(3) Confirmation of compliance with all articles of Annex A2, Installation Requirements. THIS IS A MANDATORY REQUIREMENT.

(4) Confirmation of compliance with all articles of Annex A3, Health and Safety Requirements THIS IS A MANDATORY REQUIREMENT.

The Bidder may also describe any other information it considers relevant.

Section III: Financial Bid

- (a) **Pricing:** Bidders must submit their financial bid in accordance with the Basis of Payment in Annex B. The total amount of Goods and Services Tax or Harmonized Sales Tax must be shown separately, if applicable.
- (b) **All Costs to be Included:** The financial bid must include all costs for the requirement described in the bid solicitation for the entire Contract Period, including any option years. The identification of all necessary equipment, software, peripherals, cabling and components required to meet the requirements of the bid solicitation and the associated costs of these items is the sole responsibility of the Bidder.
- (c) **Blank Prices:** Bidders are requested to insert "\$0.00" for any item for which it does not intend to charge or for items that are already included in other prices set out in the tables. If the Bidder leaves any price blank, Canada will treat the price as "\$0.00" for evaluation purposes and may request that the Bidder confirm that the price is, in fact, \$0.00. No bidder will be permitted to add or change a price as part of this confirmation. Any bidder who does not confirm that the price for a blank item is \$0.00 will be declared non-responsive.

3.1.2 Exchange Rate Fluctuation Risk Mitigation

1. The Bidder may request Canada to assume the risks and benefits of exchange rate fluctuations. If the Bidder claims for an exchange rate adjustment, this request must be clearly indicated in the bid at time of bidding. The Bidder must submit form PWGSC-TPSGC 450, Claim for Exchange Rate Adjustments with its bid, indicating the Foreign Currency Component (FCC) in Canadian dollars for each line item for which an exchange rate adjustment is required.
2. The FCC is defined as the portion of the price or rate that will be directly affected by exchange rate fluctuations. The FCC should include all related taxes, duties and other costs paid by the Bidder and which are to be included in the adjustment amount.
3. The total price paid by Canada on each invoice will be adjusted at the time of payment, based on the FCC and the exchange rate fluctuation provision in the contract. The exchange rate adjustment will only be applied where the exchange rate fluctuation is greater than 2% (increase or decrease).
4. At time of bidding, the Bidder must complete columns (1) to (4) on form PWGSC-TPSGC 450, for each line item where they want to invoke the exchange rate fluctuation provision. Where bids are evaluated in Canadian dollars, the dollar values provided in column (3) should also be in Canadian dollars, so that the adjustment amount is in the same currency as the payment.
5. Alternate rates or calculations proposed by the Bidder will not be accepted for the purposes of this exchange rate fluctuation provision.

Section IV: Certifications

Bidders must submit the certifications required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

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

4.1.1 Management, Technical and Financial Evaluation

The evaluation process will consist of 4 Stages.

4.1.1.1 STAGE 1 – Management Bid: Bidders Experience and Qualifications

The Bidder will be scored on its General Qualifications, Experience, Project References for Growth Chambers, and on its Office, Installation and Commissioning, and Maintenance personnel. It is requested that bidders use the template described in Part 3: 3.1 SECTION I and provided as Submission Form 2 for ease of evaluation by the evaluation team.

This will be scored out of **100 points** and only Bidders that score a **minimum of 75 points (75%)** will proceed to Stage 2.

Bidders who do not meet the minimum score of 75% will be considered non-responsive, be disqualified and will be given no further consideration.

4.1.1.2 STAGE 2 – Technical Bid: Mandatory Criteria

Each bid will be reviewed to determine whether it meets all mandatory requirements of the bid solicitation and points may also be awarded for how the specific requirement is met. Submission Form 3 gives full details of what elements are mandatory and which are point-rated and a single item may have a mandatory component and point rated component. All elements of the bid solicitation that are mandatory requirements are identified specifically with the words "must" or "mandatory".

If there are claims in a bid that a future upgrade or release of any of product included in the bid will meet the mandatory requirements of the bid solicitation, **where the upgrade or release is not available at bid closing, bid will not be considered meeting the mandatory requirement.**

Bids that do not comply with each and every mandatory requirement, including compliance to all articles of Annex A2 and Annex A3 will be considered non-responsive, be disqualified and will be given no further consideration.

4.1.1.3 STAGE 3 - Point Rated Technical Criteria

Submission Form 3 also contains a number of Point Rated Technical Criteria. Each bid will be rated by assigning a score to the rated requirements, which are identified in the bid solicitation by the word "rated" or by reference to a score. Bidders who fail to submit complete bids with all the information requested by this bid solicitation will be rated accordingly.

The Point-Rated Technical Criteria represent 75% of the final score. This will be scored out of **3040 points total**; bidders must score a **minimum of 2280 points total (75%)** in order to be considered and move onto the final Stage 4.

4.1.1.4 STAGE 4 - Financial Evaluation

Only Bidders that pass the required points total for Stage 3 (**2280**) will move onto the final Stage 4, Financial Evaluation and have their pricing considered.

The Financial Evaluation represents 25% of the final score. The lowest evaluated price offered will receive the maximum score of 25% and the other bids' scores prorated against the lowest evaluated price.

- (a) The financial evaluation will be conducted by calculating the Total Bid Price using the Pricing Tables completed by the bidders as follows:

B.3.1: Initial Order Total Firm Price (100%) = Total

Note: For the Optional Goods and Services, the estimated quantities listed herein are for evaluation purposes only and do not represent any commitment on the part of Canada.

B.3.2 : Optional Goods and Services Total Firm Unit and Lot Prices for column A + for column B = Total

Add the totals for B.3.1 + the totals for B.3.2 = Total Firm Bid Price

- (b) The evaluation team will then confirm that Firm Prices have been submitted for all goods and services (mandatory).
- (c) SACC Manual Clause A0220T (2014-06-26), Evaluation of Price

4.2. Basis of Selection

4.2.1 Highest Combined Rating of Technical Merit and Price

1. To be declared responsive, a bid must:
 - (a) comply with all the requirements of the bid solicitation; and
 - (b) meet all mandatory criteria; and
 - (c) obtain the required minimum of **2355 (75% for Stage 1 + 75% for Stage 3) points** overall for the technical evaluation criteria which are subject to point rating (Management : 75 points + Technical: 2280 points).
The rating is performed on a scale of **3140 points**.
2. Bids not meeting (a) or (b) or (c) will be declared non-responsive.
3. The selection will be based on the highest responsive combined rating of technical merit and price. **The ratio will be 75% for the technical merit and 25% for the price.**
4. To establish the technical merit score, the overall technical score for each responsive bid will be determined as follows: total number of points obtained / maximum number of points available multiplied by the ratio of **75%**.

5. To establish the pricing score, each responsive bid will be prorated against the lowest evaluated price and the ratio of **25%**.
6. For each responsive bid, the technical merit score and the pricing score will be added to determine its combined rating.
7. Neither the responsive bid obtaining the highest technical score nor the one with the lowest evaluated price will necessarily be accepted.

The responsive bid with the highest combined rating of technical merit (Stage 3) and price (Stage 4) will be recommended for award as the successful Growth Chamber Supply Contractor to provide the supply, installation and commissioning portion for the work to Canada at the price provided and coordinate with the General Contractor for the Infrastructure Contract.

The table below **illustrates an example** where all three bids are responsive and the selection of the contractor is determined by a **75/25 ratio** of technical merit and price, respectively. The total available points equals 135 and the lowest evaluated price is \$45,000.

Basis of Selection - Highest Combined Rating Technical Merit (75%) and Price (25%)

		Bidder 1	Bidder 2	Bidder 3
Overall Technical Score		115/135	89/135	92/135
Bid Evaluated Price		55,000	50,000	45,000
Calculations	Technical Merit Score	$115/135 \times 75 = 63.89$	$89/135 \times 75 = 49.45$	$92/135 \times 75 = 51.12$
	Pricing Score	$45/55 \times 25 = 20.46$	$45/50 \times 25 = 22.50$	$45/45 \times 25 = 25.00$
Combined Rating		84.35	71.95	76.12
Overall Rating		1st	3rd	2nd

PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

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

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

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

5.1 Certifications Required with the Bid

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

5.1.1 Declaration of Convicted Offences

As applicable, pursuant to subsection Declaration of Convicted Offences of section 01 of the Standard Instructions, the Bidder must provide with its bid, a completed [Declaration Form](#), to be given further consideration in the procurement process.

5.2 Certifications Precedent to Contract Award and Additional Information

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

5.2.1 Integrity Provisions – List of Names

Bidders who are incorporated, including those bidding as a joint venture, must provide a complete list of names of all individuals who are currently directors of the Bidder.

Bidders bidding as sole proprietorship, as well as those bidding as a joint venture, must provide the name of the owner(s).

Bidders bidding as societies, firms or partnerships do not need to provide lists of names.

5.2.2 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 (http://www.labour.gc.ca/eng/standards_equity/eq/emp/fcp/list/inelig.shtml) available from [Employment and Social Development Canada \(ESDC\) - Labour's](#) website.

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

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

The Bidder must provide the Contracting Authority with a completed annex [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.

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PART 6 - SECURITY, FINANCIAL AND OTHER REQUIREMENTS

6.1 Financial Capability

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

PART 7 - RESULTING CONTRACT CLAUSES

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

7.1 Requirement

The Contractor must provide the goods and services detailed under Requirement – Technical Specifications at Annex A1, including installation and commissioning complying with all the requirements described in Annex A2 and Annex A3.

7.1.1 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 **up to one (1) additional year period from June 30, 2016 to June 30, 2017**. 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.

7.2 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.

7.2.1 General Conditions

[2030](#) (2015-07-03), General Conditions - Higher Complexity - Goods, apply to and form part of the Contract.

7.2.2 Supplemental General Conditions

SACC Manual Clause 4001 (2015-04-01), Hardware Purchase, Lease and Maintenance
SACC Manual Clause 4003 (2010-08-16), Licensed Software
SACC Manual Clause 4004 (2013-04-25), Maintenance and Support Services for Licensed Software
SACC Manual Clause R2900D (2008-05-12), Insurance

7.3 Security Requirements

7.3.1 There is no security requirement applicable to this Contract.

Nil security screening required as there is no access to sensitive information or assets. Contractor personnel will be escorted within the specific areas of the institution/site as and where required by Agriculture and Agri-Food Canada (AAFC) personnel or those authorized by AAFC on its behalf.

Agriculture and Agri-Food Canada (AAFC) reserves the right to deny access to any site or part thereof to any Contractor personnel, at any time.

7.4 Term of Contract

7.4.1 Delivery Date for Initial Order

1. All the deliverable materials for the initial order must be received on site on or **before March 31, 2016**.
2. All Growth Chambers deliverables for the initial order must be fabricated to specifications, installed, commissioned and tested to full working capacity **on or before June 30, 2016**.

7.4.2. Delivery Date for Optional Goods and Services

1. All deliverables from orders placed after the initial order must be delivered, installed, commissioned and tested **within _____ (Bidder to insert no. of estimated weeks)** from date of order.

7.4.3 Delivery and Unloading

1. Delivery trucks must be equipped with an unloading device which will permit unloading at sites with no hydraulic, stationary or other type of unloading facility.
2. When making deliveries, sufficient personnel must be provided to permit unloading of any type of vehicle without the assistance of federal government personnel.
3. At some sites, the delivery truck must be unloaded while parked at the curb. When material is placed on the sidewalk, it must be placed in proximity to the designated entrance so as to be readily accessible to transport by mechanical handling equipment utilized by site personnel.

7.4.4 Installation, Testing and Commissioning

All installation, testing and commissioning in accordance with Annex A2 Installation Requirements and Annex A3 Health and Safety Requirements for the initial order must be completed on or before **June 30, 2016**.

All installation, testing and commissioning must be in accordance with Annex A2 Installation Requirements and Annex A3 Health and Safety Requirements, where applicable, **for the optional goods - if exercised** - and must be in accordance with the schedule agreed upon with the Departmental Representative.

7.4.5 Training

Complete user training and full instructions on use of supplied equipment and systems must be provided on site at the **Agriculture and Agri-Food Canada (AAFC) - Pacific Agri-Food Research Centre (PARC) at Summerland, B.C** for research staff, support staff and maintenance personnel (estimated 12 people) upon request of the Departmental Representative, within thirty (30) working days after the Commissioning of the equipment.

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7.5 Authorities

7.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Elizabeth Perez
Supply Officer
Public Works and Government Services Canada
Acquisitions Branch, Pacific Region
219 - 800 Burrard Street, Vancouver, BC V6Z 0B9

Telephone: 604-775-7690
Facsimile: 604-775-7526
Email Address: elizabeth.perez@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.

7.5.2 Departmental Representative

The Departmental Representative for the Contract is: **(To be inserted at Contract award)**

Name: _____
Title: _____
Address: _____

Telephone: ____-____-____
Facsimile: ____-____-____
E-mail: _____

In its absence, the Departmental Representative is:

Name: _____
Title: _____
Address: _____

Telephone: ____-____-____
Facsimile: ____-____-____
E-mail: _____

The Departmental Representative 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 Departmental Representative; however, the Departmental Representative 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.

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7.5.3 Contractor's Representative

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

Telephone: _____
Facsimile: _____
E-mail: _____

7.6 Payment

7.6.1 Basis of Payment – Annex B

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.

7.6.2 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.

7.7 Invoicing Instructions

1. 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.

7.8 Certifications

7.8.1 Compliance

The continuous compliance with the certifications provided by the Contractor in its bid and the ongoing cooperation in providing associated information are conditions of the Contract. Certifications are subject to verification by Canada during the entire period of the Contract. If the Contractor does not comply with any certification, fails to provide the associated information, or if it is determined that any certification made by the Contractor in its bid is untrue, whether made knowingly or unknowingly, Canada has the right, pursuant to the default provision of the Contract, to terminate the Contract for default.

7.8.2 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.

7.9 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in British Columbia.

7.10 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 General Conditions 2030 (2015-07-03) Higher Complexity - Goods;
- (c) Annex A1, Requirement: Technical Specifications; Annex A2, Installation Requirements and Annex A3, Health and Safety Requirements;
- (d) 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;
- (e) Annex B, Basis of Payment;
- (f) 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)*).

7.11 Insurance

7.11.1 Certificate of Insurance

The Contractor must provide the Certificate of Insurance detailed under Annex D.

7.12 Contract Financial Security

1. The Contractor must provide one of the following contract financial securities within **30** calendar days after the date of contract award:

- a. a performance bond form PWGSC-TPSGC 505 and a labour and material payment bond form PWGSC-TPSGC 506, each in the amount of **fifty (50%)** percent of the Contract Price; or
- b. a security deposit as defined in clause E0008C in the amount of **twenty (20%)** percent of the Contract Price.

Any bond must be accepted as security by one of the bonding companies listed in Treasury Board Contracting Policy, Appendix L, Acceptable Bonding Companies.

2. Security deposits in the form of government guaranteed bonds with coupons attached will be accepted only if all coupons that are unmatured, at the time the security deposit is provided, are taken with respect to coupons that will mature while the bonds are pledged as security, when such coupons are in excess of the security deposit requirement.
3. If Canada does not receive the required financial security within the specified period, Canada may terminate the Contract for default pursuant to the Contract default provision.

7.12.1 Security Deposit Definition – Contract

1. "security deposit" means

- a. a bill of exchange that is payable to the Receiver General for Canada and certified by an approved financial institution or drawn by an approved financial institution on itself; or
- b. a government guaranteed bond; or
- c. an irrevocable standby letter of credit, or
- d. such other security as may be considered appropriate by the Contracting Authority and approved by Treasury Board;

2. "approved financial institution" means

- a. any corporation or institution that is a member of the Canadian Payments Association;
- b. a corporation that accepts deposits that are insured by the Canada Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec to the maximum permitted by law;
- c. a credit union as defined in paragraph 137(6) of the Income Tax Act;
- d. a corporation that accepts deposits from the public, if repayment of the deposits is guaranteed by a Canadian province or territory; or
- e. the Canada Post Corporation.

3. "government guaranteed bond" means a bond of the Government of Canada or a bond unconditionally guaranteed as to principal and interest by the Government of Canada that is:

- a. payable to bearer;
- b. accompanied by a duly executed instrument of transfer of the bond to the Receiver General for Canada in accordance with the Domestic Bonds of Canada Regulations;
- c. registered in the name of the Receiver General for Canada.

4. "irrevocable standby letter of credit"

- a. means any arrangement, however named or described, whereby a financial institution (the "Issuer"), acting at the request and on the instructions of a customer (the "Applicant"), or on its behalf,
 - i. will make a payment to or to the order of Canada, as the beneficiary;
 - ii. will accept and pay bills of exchange drawn by Canada;
 - iii. authorizes another financial institution to effect such payment, or accept and pay such bills of exchange; or
 - iv. authorizes another financial institution to negotiate, against written demand(s) for payment, provided that the conditions of the letter of credit are complied with.
- b. must state the face amount which may be drawn against it;

c. must state its expiry date;
d. must provide for sight payment to the Receiver General for Canada by way of the financial institution's draft against presentation of a written demand for payment signed by the authorized departmental representative identified in the letter of credit by his/her office;
e. must provide that more than one written demand for payment may be presented subject to the sum of those demands not exceeding the face amount of the letter of credit;
f. must provide that it is subject to the International Chamber of Commerce (ICC) Uniform Customs and Practice (UCP) for Documentary Credits, 2007 Revision, ICC Publication No. 600. Pursuant to the ICC UCP, a credit is irrevocable even if there is no indication to that effect; and
g. must be issued (Issuer) or confirmed (Confirmer), in either official language, by a financial institution that is a member of the Canadian Payments Association and is on the letterhead of the Issuer or Confirmer. The format is left to the discretion of the Issuer or Confirmer.

7.13 Warranty

Section 09 of general conditions 2010A

7.13.1 Warranty - Contractor responsible for all costs

Section 09 entitled Warranty of general conditions 2010A is amended by deleting subsection 2 in its entirety and replacing it with the following:

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

All other provisions of the warranty section remain in effect.

7.14 SACC Manual Clauses

B7500C (2006-06-16), Excess Goods

ANNEX A1

REQUIREMENT TECHNICAL SPECIFICATIONS

Item	Description
1.0	GENERAL
1.1	REFERENCES
1.1.1	American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
1.1.1.1	ANSI/ASME B16.26-[2001], Cast Copper Alloy Fittings for Flared Copper Tubes.
1.1.1.2	ANSI/ASME B16.29-[2001], Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings-DWV.
1.1.2	American National Standards Institute/National Fire Protection Association (ANSI/NFPA)
1.1.2.1	ANSI/NFPA 255-[2000], Standard Method of Test of Surface Burning Characteristics of Building Materials.
1.1.3	American Society for Testing and Materials International, (ASTM)
1.1.3.1	ASTM A 167-99(2009) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
1.1.3.2	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.
1.1.3.3	ASTM A 480/A 480M-14b, Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip. Finish for sheet: No. 4 Finish-General purpose polished finish, one or both sides.
1.1.3.4	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.
1.1.3.5	ASTM B 88M-05, Standard Specification for Seamless Copper Water Tube [Metric].
1.1.3.6	ASTM B 280-13, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
1.1.3.7	ASTM E 84-15a, Standard Test Method for Surface Burning Characteristics of Building Materials.
1.1.3.8	ASTM E 162-13, Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.
1.1.4	Canadian General Standards Board (CGSB)
1.1.4.1	CAN/CGSB-19.13-M87, Sealing Compound One-Component, Elastomeric, Chemical Curing.
1.1.5	Canadian Standards Association (CSA International)
1.1.5.1	CSA C22.2 No.137-M1981(R2014), Electric Luminaires for Use in Hazardous Locations.
1.1.6	Underwriters' Laboratories of Canada
1.1.6.1	CAN/ULC-S704-2011, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
1.1.6.2	CAN/ULC-S705.1-2011, Thermal Insulation - Spray Applied Rigid Polyurethane

Item	Description
	Foam, Medium Density, Material Specification.
1.2	QUALITY ASSURANCE:
1.2.1	Electrical Certification: 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.
1.2.2	Quality Standards: The Manufacturer must ensure that a Nationally Recognized quality program, such as ISO9001, is used in the order, design and manufacturing processes of the Growth Chambers and all related equipment.
1.2.3	Fabrication Quality: The Contractor must supply a photo record during fabrication in the factory at the interval(s) or milestone(s) to be determined by the Departmental Representative. The Departmental Representative also has the right to visit the factory at any point of time during fabrication to review fabrication quality
1.3	WARRANTY:
1.3.1	Manufacturer must provide equipment and labour warranty for a minimum of 24 months from the date of commissioning. The warranty must be a comprehensive warranty that covers all major components of the growth chamber including but not limited to cabinet construction materials, controllers, compressors, evaporators and all optional equipment provided with the growth chamber. The warranty must include parts and labour for a minimum of the first 24 months. Details of warranty must be provided as part of the operation and maintenance manual.
1.3.2	An additional 3 years of diagnostic and troubleshooting services must be provided.
1.4	UTILITY REQUIREMENTS
1.4.1	Electrical: Chambers must be designed for the following Electrical Service: 60Hz: 120/208-3 phase-60Hz-4 wire plus ground.
1.4.2	Water: Chambers must be designed with water line connections on the top of the chamber. The Chambers must have a single connection line for all hose bibs for the purpose of controlled irrigation, this will be connected to the tempered water system and will be pressure reduced. All additional hose bibs (not connected to the automated watering system) will have an additional connection line that will be connected to the standard water supply and will not be pressure reduced.
1.5	SOURCE QUALITY CONTROL
1.5.1	All chamber types must be manufactured by one single source.
1.5.2	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.
2.0	PRODUCTS
2.1	LOCAL CONTROL SYSTEM
2.1.1	General Requirements:
2.1.1.1	All chambers must be equipped with a control system designed specifically for research horticultural and agricultural and entomological use with all equipment and enclosures suitably designed for the electrical and climate conditions of these

Item	Description
	applications including, but not limited to, precise temperature regulation and controlled lighting and humidity.
2.1.1.2	Control system must have, at a minimum, an LCD touch screen with readouts of relevant values.
2.1.1.3	All chambers must share the same control system
2.1.1.4	The control system must be capable of storing a minimum of 10 real-time user-entered programs with a minimum of 15 minute program resolution. Daily programs must have the ability to be linked to simulate multi day, or seasonal programs.
2.1.1.5	The controller must allow the following adjustments at both the chamber and remotely: temperature, humidity levels, automated watering schedule, and light level set-points.
2.1.1.6	Programs must be able to be entered via the controller's local control system, and via a remote desktop computer.
2.1.1.7	Programs must be capable of transitioning from conditions in either step mode or ramp mode or both (preferable).
2.1.1.8	The control system must be accessed and managed through a networked PC server provided by the Contractor (see 2.1.1.9), which provides the primary operator interface and performs other housekeeping tasks such as Data Archiving and backup of configuration and settings. Chambers must be connected to the central PC for centralized control of all controlled parameters. This must include a PC, software that is updated to the latest version, and all controllers required for running the chambers through the centralized Control system.
2.1.1.9	The contractor must provide the networked desktop computer to run the control system and data collection services.
2.1.2	Data Logging and Graphing:
2.1.2.1	All controlled parameters must be recordable to provide a log of actual experimental results vs set values. Stored data must be transferable to a desktop computer via a network-connected PC.
2.1.2.2	Program must enable graphing to allow users to view historical data in graph form or compare programmed performance to actual performance.
2.1.3	Alarms:
2.1.3.1	System must incorporate floating alarms tracking temperature and must have the ability to be configured for other controlled parameters such as, but not limited to, humidity or lighting.
2.1.3.2	Alarm set points must be programmable on a per experiment basis and determination of action required when an alarm is activated must also be programmable.
2.1.3.3	Alarms must be logged for access by viewing on the local control unit, and via a network-connected PC.
2.1.3.4	Alarms must have programmable alarm handling features such as sending out automated email or phone notifications to the user.
2.1.4	Security:
2.1.4.1	Multiple password-protected levels (a minimum of three discrete levels) must be provided for users, administrators and service personnel.

Item	Description
2.1.5	User Control:
2.1.5.1	The computer's networked controller must include individual logon capabilities that would allow end-users to control their own chambers, but not to manipulate the settings of other chambers for which they are not authorized.
2.1.6	Trouble Shooting:
2.1.6.1	On board diagnostics screen must allow for service personnel to view all inputs and outputs including access to the service life of components including lamp burning hours, valve cycle numbers and similar component functioning.
2.1.7	Communications:
2.1.7.1	Controller must be shipped communications ready for hook-up to a local area network.
2.1.8	Auto Watering System:
2.1.8.1	Must have hose bib connection and auxiliary switch, terminated in control panel, for timed control of automatic watering.
2.1.9	Surge Protection:
2.1.9.1	The controller must include surge protection and uninterrupted power supply (UPS), for continuous operation of the controller and data logging during power interruptions.
2.2	CHAMBER SPECIFICATIONS
2.2.1	Service Connections – All Chamber Types
2.2.1.1	All service connections must be made from the top front of the chambers since they will be placed side by side and back to back.
2.2.2	Growth Chambers Types 1 & 2
2.2.2.1	Recommended Approximate Exterior Dimensions: 250 W x 90 D x 270H (cm) nominal
2.2.2.2	Convertibility of Tiers: Must be able to be easily converted by the user from single tier lit shelving units to at least three tier lit shelving units.
2.2.2.3	Minimum Interior Volume: 2.5m ³
2.2.2.4	Minimum Lighted Growth Area: Single tier configuration = 1.7m ² Two tier configuration = 3.4m ² Three tier configuration = 5.1m ²
2.2.2.5	Minimum Growth Height: Single tier configuration = 1500mm Two tier configuration = 600mm Three tier configuration = 350mm
2.2.2.6	Shelving units: Shelving units must be constructed from corrosion resistant metal. Shelves should have metal mesh work surface for stable support of small plant pots The individual shelves must be easily adjustable in height and be removable.
2.2.2.7	Cabinet Construction: Chambers must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications.
2.2.2.8	Wall Sanitation: Wall panels must be easy to sanitize between chamber uses.
2.2.2.9	Doors and Window: Doors must provide easy and secure access to chambers. Observation windows are desirable.
2.2.2.10	Control Panel: Control Panel Display must be mounted on the front of the

Item	Description
	chamber.
2.2.2.11	Legs: Chambers must have adjustable leg height to suit uneven floor level.
2.2.2.12	Additional Equipment Provisions:
2.2.2.12.1	Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs (See 1.4.2 above)
2.2.2.12.2	Chambers should be equipped with following additional equipment: a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)
2.2.3	Growth Chambers Type 3
2.2.3.1	Recommended Approximate External Dimensions: 350 W x 175 D x 280 H (cm) nominal.
2.2.3.2	Chamber must have central aisle, with growth area on both sides of aisle.
2.2.3.3	Convertibility of Tiers: Must be able to be easily converted by the user from single tier lit shelving units to at least three tier lit shelving units.
2.2.3.4	Minimum Interior Volume: 9m ³
2.2.3.5	Minimum Lighted Growth Area: Single tier configuration = 2.2m ² Two tier configuration = 4.3m ² Three tier configuration = 6.4m ²
2.2.3.6	Minimum Growth Height (not including collection trays): Single tier configuration = 1500mm Two tier configuration = 750mm Three tier configuration = 500mm
2.2.3.7	Chambers must be seismically secured to the floor slab. All edges of the chambers must be sealed tight against the floor slab to provide water containment.
2.2.3.7.1	Sealants must be compatible with the wall panel material and to be Multi-component chemical cure sealants: (for total submersion sealing for possibility of standing water), conform to CAN/CGSB-2-19.24-M90 (TT-00227E-Type 11, Class A) standard, sealing compounds and as otherwise specified to exceed that standard;
2.2.3.7.2	Sealants must bear, in addition to the product identification name, the qualification number when tested under CAN/CGSB standard, Type 1 (self-leveling - horizontal joints).
2.2.3.7.3	Caulking work must be guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and/or staining adjacent surfaces for a period of three (3) years from the date of Certificate of Substantial Performance.
2.2.3.8	Cabinet Construction: Chamber must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications
2.2.3.9	Threshold: Chamber must be constructed with a threshold below the door(s) to prevent waste water and soil from escaping beneath the door.
2.2.3.10	Doors and Windows: Doors must provide easy and secure access to chambers. Observation windows are desirable.
2.2.3.11	Control Panel: Must be located on left hand or right hand side of door on front of chamber.

Item	Description
2.2.3.12	Wall Sanitation: Wall panels must be easy to sanitize between chamber uses.
2.2.3.13	Additional Equipment Provisions:
2.2.3.13.1	Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs d) Compressed air spigot
2.2.3.13.2	Chambers should be equipped with following additional equipment: a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)
2.2.3.14	Collection Trays: Collection trays must be mounted beneath plant shelving to collect waste soil and water. All trays must be removable and autoclavable.
2.2.3.15	Shelving units: Shelving units must be constructed from corrosion resistant metal. Shelves should have metal mesh work surface for stable support of small plant pots The individual shelves must be easily adjustable in height and be removable.
2.2.4	For Growth Chamber Type 4:
2.2.4.1	Recommended Approximate External Dimensions: 350 W x 320 D x 280 H (cm) nominal, excluding vestibule.
2.2.4.2	Central aisle with growth area on both sides of aisle.
2.2.4.3	Tiers: Must be able to be easily converted by the user from single tier lit shelving units to at least three tier lit shelving units.
2.2.4.4	Minimum Interior capacity: 18m ³
2.2.4.5	Minimum Lighted Growth Area: Single Tier chamber = 4.3m ² Two tier chamber = 8.6m ² Three tier chamber = 12.5m ²
2.2.4.6	Minimum Growth Height (not including collection trays): Single tier chamber = 1500mm Two tier chamber = 750mm Three tier chamber = 500mm
2.2.4.7	Chambers must be seismically secured to the floor slab. All edges of the chambers must be sealed tight against the floor slab to provide water containment.
	Sealants must be compatible with the wall panel material and to be Multi-component chemical cure sealants: (for total submersion sealing for possibility of standing water), conform to CAN/CGSB-2-19.24-M90 (TT-00227E-Type 11, Class A) standard, sealing compounds and as otherwise specified to exceed that standard;
	Sealants must bear, in addition to the product identification name, the qualification number when tested under CAN/CGSB standard, Type 1 (self-leveling - horizontal joints).
	Caulking work must be guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and/or staining adjacent surfaces for a period of three (3) years from the date of Certificate of Substantial Performance.
2.2.4.8	Cabinet Construction: Must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate

Item	Description
	conditions of these applications
2.2.4.9	Chamber must be constructed with a threshold below the door(s) to prevent waste water and soil from escaping beneath the door.
2.2.4.10	Doors and Window: Doors must provide easy and secure access to chambers. Windows are desirable.
2.2.4.11	Control Panel: Must be located on left hand or right hand side of door on front of chamber.
2.2.4.12	Wall Sanitation: Wall panels must be easy to sanitize between chamber uses.
2.2.4.13	Additional Equipment Provisions:
2.2.4.13.1	Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs d) Compressed air spigot
2.2.4.13.2	Chambers should be equipped with following additional equipment: a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)
2.2.4.14	Collection Trays: Collection trays must be mounted beneath plant shelving to collect waste soil and water. All trays must be removable and autoclavable.
2.2.4.15	Anteroom: must have 1220 mm (4') deep outer vestibule with additional door for plant pest containment of pests with a higher risk of escape.
2.2.4.16	Shelving units: Shelving units must be constructed from corrosion resistant metal. Shelves should have metal mesh work surface for stable support of small plant pots The individual shelves must be easily adjustable in height and be removable.
2.2.5	For Growth Chamber Type 5:
2.2.5.1	Recommended Approximate External Dimensions: 295W x 295 D x 280H (cm) nominal.
2.2.5.2	Central aisle with growth area on both sides of aisle.
2.2.5.3	Tiers: Must be able to be easily converted by the user from single tier lit shelving units to at least three tier lit shelving units.
2.2.5.4	Minimum Interior Volume: 14m ³
2.2.5.5	Minimum Lighted Growth Area: Single Tier chamber = 3.6m ² Two tier chamber = 7.2m ² Three tier chamber = 10.8m ²
2.2.5.6	Minimum Growth Height (not including collection trays): Single tier chamber = 1500mm Two tier chamber = 750mm Three tier chamber = 500mm
2.2.5.7	Chambers must be seismically secured to the floor slab. All edges of the chambers must be sealed tight against the floor slab to provide water containment.
	Sealants must be compatible with the wall panel material and to be Multi-component chemical cure sealants: (for total submersion sealing for possibility of standing water), conform to CAN/CGSB-2-19.24-M90 (TT-00227E-Type 11, Class A) standard, sealing compounds and as otherwise specified to exceed that

Item	Description
	standard;
	Sealants must bear, in addition to the product identification name, the qualification number when tested under CAN/CGSB standard, Type 1 (self-leveling - horizontal joints).
	Caulking work must be guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and/or staining adjacent surfaces for a period of three (3) years from the date of Certificate of Substantial Performance.
2.2.5.8	Cabinet Construction: Must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications
2.2.5.9	Chamber must be constructed with a threshold below the door(s) to prevent waste water and soil from escaping beneath the door.
2.2.5.10	Doors and Window: Doors must provide easy and secure access to chambers. Windows are desirable.
2.2.5.11	Control Panel: Must be located on left hand or right hand side of door on front of chamber.
2.2.5.12	Wall Sanitation: Wall panels must be easy to sanitize between chamber uses.
2.2.5.13	Additional Equipment Provisions:
2.2.5.13.1	Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs (See 1.4.2 above) d) Compressed air spigot
2.2.5.13.2	Chambers should be equipped with following additional equipment: a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)
2.2.5.14	Collection Trays: Collection trays must be mounted beneath plant shelving to collect waste soil and water. All trays must be removable and autoclavable.
2.2.5.15	Shelving units: Shelving units must be constructed from corrosion resistant metal. Shelves should have metal mesh work surface for stable support of small plant pots The individual shelves must be easily adjustable in height and be removable.
2.2.6	For Growth Chamber Type 6:
2.2.6.1	Recommended Approximate External Dimensions: 295W x 295D x 260H (cm) nominal.
2.2.6.2	Chamber shall have central aisle with plant growth area on both sides of chamber.
2.2.6.3	Minimum Interior Volume: 14m ³
2.2.6.4	Minimum Lighted Growth Area: 4.25m ²
2.2.6.5	Minimum Growth Height: 2000mm
2.2.6.6	Chambers must be seismically secured to the floor slab. All edges of the chambers must be sealed tight against the floor slab to provide water containment.
	Sealants must be compatible with the wall panel material and to be Multi-component chemical cure sealants: (for total submersion sealing for possibility of standing water), conform to CAN/CGSB-2-19.24-M90 (TT-00227E-Type 11, Class A) standard, sealing compounds and as otherwise specified to exceed that

Item	Description
	standard;
	Sealants must bear, in addition to the product identification name, the qualification number when tested under CAN/CGSB standard, Type 1 (self-leveling - horizontal joints).
	Caulking work must be guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and/or staining adjacent surfaces for a period of three (3) years from the date of Certificate of Substantial Performance.
2.2.6.7	Cabinet Construction: Must be designed specifically for horticultural, agricultural, and/or entomological research with all materials suitably designed for the climate conditions of these applications
2.2.6.8	Chamber must be constructed with a threshold below the door(s) to prevent waste water and soil from escaping beneath the door.
2.2.6.9	Doors and Window: Doors must provide easy and secure access to chambers. Windows are desirable.
2.2.6.10	Control Panel: Must be located on left hand or right hand side of door on front of chamber.
2.2.6.11	Additional Equipment Provisions:
2.2.6.11.1	Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs (see 1.4.2 above) d) Compressed air spigot
2.2.6.11.2	Chambers should be equipped with following additional equipment: a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)
2.2.6.12	Collection Trays: Collection trays must be mounted beneath plant shelving to collect waste soil and water. All trays must be removable and autoclavable.
2.2.6.13	Benching: Must provide two (2) free-standing, adjustable corrosion resistant metal benches. These benches should have metal mesh work surfaces, and must cover the entire growth area. Benches must be easily removable from the chamber
2.2.6.14	Wall Sanitation: Wall panels must be easy to sanitize between chamber uses.
2.3	LIGHTING
2.3.1	For Growth Chamber Types 1 & 2:
2.3.1.1	Minimum Light Intensity and Uniformity: Light intensity must be adjustable at a minimum from 0 to 1000 $\mu\text{mole}/\text{m}^2/\text{s}$ in single tier configuration. Light intensity must be adjustable at a minimum from 0 to 450 $\mu\text{mole}/\text{m}^2/\text{s}$ in two or three tier configuration, measured at a 150mm (6 inches) distance from light source.
2.3.1.2	Canopy: Lamp canopies must be easily height adjustable. Top canopy must be counterbalanced for ease of vertical movement.
2.3.1.3	Light Control: Lights must have a minimum 3 levels of control.
2.3.1.4	Lamps: Light must be compatible with horticultural and agricultural and entomological research. Replacement lights must be readily commercially available.
2.3.1.5	Ballasts: Ballasts must be high efficiency electronic (where applicable).

Item	Description
2.3.1.6	Light Meter: A quantum light meter with alarm capability must be included with chamber for displaying and recording of light output.
2.3.2	For Growth Chamber Types 3, 4, &5:
2.3.2.1	Minimum Light Intensity and Uniformity: Light intensity adjustable at a minimum from 0 to 1000 umole/m ² /s in single tier configuration. Light intensities adjustable at a minimum from 0 to 450 umole/m ² /s in two or three tier configuration, measured at a 150mm (6 inches) distance from light source
2.3.2.2	Top Canopy Adjustability: Top light canopies must be easily height adjustable and must be counterbalanced allowing manual adjustable vertical movement.
2.3.2.3	Second and Third Light Canopies: Second and third light canopies must be cantilevered from the side of the growth unit, and must be easily removable and adjustable in height
2.3.2.4	Light Control: Lights must have a minimum 3 levels of control.
2.3.2.5	Lamps: Light must be compatible with horticultural and agricultural and entomological research. Replacement lights must be readily commercially available.
2.3.2.6	Ballasts: Ballasts must be high efficiency electronic (where applicable).
2.3.2.7	Light Meter: A quantum light meter with alarm capability must be included with chamber for displaying and recording of light output.
2.3.3	For Growth Chamber Types 6:
2.3.3.1	Minimum Light Intensity and Uniformity: Light intensity must be adjustable at a minimum from 0 to 800 umole/m ² /s in single tier configuration, measured at a 150mm (6 inches) distance from light source.
2.3.3.2	Canopy: Canopies must be easily height adjustable and must be counterbalanced, allowing manual adjustable vertical movement.
2.3.3.3	Light Control: Lights must have a minimum 3 levels of control.
2.3.3.4	Lamps: Light must be compatible with horticultural and agricultural and entomological research. Replacement lights must be readily commercially available.
2.3.3.5	Ballasts: Ballasts must be high efficiency electronic (where applicable).
2.3.3.6	Light Meter: A quantum light meter with alarm capability must be included with chamber for displaying and recording of light output.
2.4	TEMPERATURE CONTROL
2.4.1	Control: Chamber temperature control must be uniform and consistent to be compatible with horticultural and agricultural and/or entomological research. Minimum of $\pm 1^{\circ}\text{C}$, at control point.
2.4.2	Temperature Safety Limits:
2.4.2.1	Primary: The chamber must have a programmable high and low temperature limit tracking alarm that automatically follows the programmed set point.
2.4.2.2	Secondary: The chamber must have an independent, high and low temperature alarm for increased security.
2.4.3	Sensors: Sensors must be compatible with horticultural and agricultural and entomological research. Sensors must be located in a self-contained, portable

Item	Description
	aspirator.
2.4.4	Temperature Control Range:
2.4.4.1	Minimum Range for Growth Chamber Type 1 must be: +4°C to + 40°C lights OFF, +10°C to +40°C lights ON.
2.4.4.2	Minimum Range for Growth Chamber Type 2 must be: -5°C to + 40°C lights OFF, +4°C to +40°C lights ON
2.4.4.3	Minimum Range for Growth Chamber Types 3 to 6 must be: +10°C to +35°C lights OFF, +15°C to + 35°C lights ON.
2.4.5	Low Temperature Stability: For Growth Chamber type 2: Temperature must be maintained within 0.5°C of set point temperatures at all times.
2.5	REFRIGERATION
2.5.1	For Growth Chamber Types 1 & 2:
2.5.1.1	Condensing Unit: Cabinet must be supplied with a water-cooled condensing unit with hot gas bypass system for continuous compressor operation. Condensing unit must be located in the machine compartment and must include a 3-way water valve and hand operated shut off bypass valve. The condensing unit must operate with the cooling tower which is set to provide water at +24°C to +29°C.
2.5.1.2	Valve: Chamber must have an electromagnetic 3-way proportional valve that smoothly modulates heating and cooling.
2.5.1.3	Evaporator: The evaporator must have copper-tube construction.
2.5.1.4	Refrigerant: Condensing unit must be charged with an environmentally friendly CFC-free refrigerant that is readily commercially available.
2.5.1.5	Monitoring: High and low pressure transducers must be provided to monitor the condition of the refrigeration system. Control systems must be able to log, and alarm; should high/ low pressure values exceed user specified alarm value.
2.5.1.6	Chamber Type 2 Extended Temperature System: Chamber type 2 must be designed with multiple coils or coil segments for extended use at +4°C without affecting chamber temperature during defrost cycles of evaporators. The secondary evaporators should take over when the primary evaporator goes through its defrost cycle.
2.5.2	For Growth Chamber Types 3, 4, 5 & 6:
2.5.2.1	Condensing Unit: The cabinet must be supplied a water-cooled, hermetically sealed condensing unit with hot gas bypass system for continuous compressor operation, extended compressor life and close temperature control. The condensing unit must operate with a cooling tower which is set to provide water at +24°C to +29°C.
2.5.2.2	Valves: Chamber must have an electromagnetic 3-way proportional valve that smoothly modulates heating and cooling.
2.5.2.3	Evaporator: The evaporator must have copper-tube construction.
2.5.2.4	Refrigerant: The condensing unit must be charged with an environmentally friendly CFC-free refrigerant that is readily commercially available.
2.5.2.5	Monitoring: High and low pressure transducers must be provided to monitor the condition of the refrigeration system. Control systems must be able to log, and alarm should high/ low pressure values exceed user specified alarm value.
2.6	AIR FLOW

Item	Description
2.6.1	For Growth Chamber Types 1 & 2:
2.6.1.1	Direction and Uniformity: Airflow should be vertical in single tier configuration and must be horizontal in multi-tier configuration. For all configurations, airflow must be uniform over the growth area(s)
2.6.1.2	Components: The Contractor must ensure that the conditioning unit contains all fans, heaters and valves necessary to meet the specified parameters.
2.6.1.3	Fresh Air: The chamber must have individual adjustment of positively sealed inlet and outlet from open approximately 0.57m ³ /min (20ft ³ /min) to closed.
2.6.1.4	Filters: Must have HEPA filter compatibility on fresh air intake and exhaust, removable and exchangeable with standard air filters.
2.6.1.5	Exhaust Collar: Must include an exhaust collar to connect to building central exhaust system.
2.6.2	For Growth Chamber Types 3, 4 & 5:
2.6.2.1	Direction and Uniformity: For single tier configuration, airflow can be vertical or, preferably, horizontal. Airflow must be horizontal for multi-tier configuration. For all configurations, airflow must be uniform over the growth area(s)
2.6.2.2	Components: The Contractor must ensure that the conditioning unit contains all fans, heaters and valves necessary to meet the specified parameters.
2.6.2.3	Fresh Air: Chamber must have minimum airflow of 40 cfm
2.6.2.4	Filters: Filters must have HEPA filter compatibility on fresh air intake and exhaust, removable and exchangeable with standard air filters.
2.6.2.5	Occupancy Switch: Should have switch mounted on exterior of chamber that temporarily slows fans to reduce ambient noise.
2.6.2.6	Exhaust Collar: Must include exhaust collar to connect to building central exhaust system.
2.6.3	For Growth Chamber Type 6:
2.6.3.1	Direction and uniformity: Air flow must be vertical and uniform over the growth area(s).
2.6.3.2	Components: The Contractor must ensure that the conditioning unit contains all fans, heaters and valves necessary to meet the specified parameters.
2.6.3.3	Fresh Air: Chamber must have minimum airflow of 80
2.6.3.4	Filters: Filters must have HEPA filter compatibility on fresh air intake and exhaust, removable and exchangeable with standard air filters.
2.6.3.5	Occupancy Switch: Should have switch mounted on exterior of chamber that temporarily slows fans to reduce ambient noise.
2.6.3.6	Exhaust Collar: Must include exhaust collar to connect to building central exhaust system.
2.7	HUMIDITY CONTROL
2.7.1	For Growth Chamber Types 1 & 2:
2.7.1.1	Humidity Control Range: Must be up to 75% RH lights OFF, 70% RH lights ON, with a 25°C maximum dew point
2.7.1.2	Additive humidity: Chambers must use additive humidification for controlling humidity levels (Ultrasonic preferred)
2.7.1.3	Control: Control to ±5% RH must be provided. System must incorporate a dry humidity sensor to directly measure humidity in %RH.

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EZ899-160422/A
Client Ref. No. - N° de réf. du client
EZ899-160422

Amd. No. - N° de la modif.
File No. - N° du dossier
VAN-5-38086

Buyer ID - Id de l'acheteur
VAN584
CCC No./N° CCC - FMS No./N° VME

Item	Description
2.7.1.4	Dehumidification: Range must be down to 50% RH, with a minimum 10°C dew point.
2.7.2	For Growth Chamber Types 3, 4, 5, & 6:
2.7.2.1	Humidity Control Range: Up to 55% RH lights OFF or On limited by a +25°C maximum dew point
2.7.2.2	Additive humidity: Chambers must use additive humidification for controlling humidity levels (Ultrasonic preferred)
2.7.2.3	Control: Control to $\pm 5\%$ RH must be provided. System must incorporate a dry humidity sensor to directly measure humidity in %RH.
2.7.2.4	Dehumidification: Range must be down to 50% RH, with a minimum 10°C dew point.

ANNEX A2

INSTALLATION REQUIREMENTS

1.0 GENERAL

1.1 SUMMARY OF WORK

- .1 Work of this contract comprises the supply and installation of growth chambers at Level 2 of Pacific Agri-Food Research Centre at 4200 97 Highway, Summerland B.C. The installation and commissioning of the growth chambers will be done in co-operation with the Infrastructure Contractor. In this Installation Statement of Work, in order to separate its roles from those of the Infrastructure Contractor responsible for the adaptations to the site for the chambers, the Contractor supplying and delivering the growth chambers will be identified as the "Supply Contractor".
- .2 The intent of the design is to replace existing chambers with new growth chambers of a variety of sizes and capacities to facilitate scientific experiments that ranges in sizes and scales. The current plan is to procure 10 growth chambers (4 x Type 3, 2 x Type 4, 3 x Type 5 and 1 x Type 6) at the initial stage. The infrastructure will be constructed with sufficient capacity for potential future chambers (7 x Type 1, 2 x Type 2 and 4 x Type 3) which may be acquired subject to funding availability.
- .3 The Supply Contractor must co-operate and coordinate with the Infrastructure Contractor that will prepare the space for the growth chambers and provide all infrastructure and final utility connections to the growth chambers on site, in carrying out their respective work- and in carrying out instructions from the Departmental Representative.
- .4 The Supply Contractor must coordinate work with the Infrastructure Contractor. If any part of the work under this Contract depends for its proper execution or result upon work of the other Contractor, the Supply Contractor must report promptly to the Departmental Representative, in writing, any defects which may interfere with proper execution of its work.
- .5 The Supply Contractor must co-ordinate use of the premises under direction of the Departmental Representative.
- .6 The Supply Contractor must obtain and pay for use of additional storage or work areas needed for work under this contract.
- .7 During the entire construction period, normal operation of the entire building must be maintained.
- .8 The Supply Contractor must co-operate with the Departmental Representative and the Infrastructure Contractor in scheduling operations to minimize conflicts in the use of space and to facilitate usage of adjacent areas. In the event of a conflict the Supply Contractor will accommodate changes to their operations to minimize interference with building operations. The Departmental Representative will have the final say in the resolution of any such conflicts.
- .9 The Supply Contractor must perform work in accordance with National Building Code for Canada 2010, Workers' Compensation Board of BC, B.C. Building Code 2012 and any

other code of provincial or local application provided that, in any case of conflict or discrepancy, the more stringent requirements will apply.

- .10 It is requested that the Supply Contractor commence work immediately upon Contract award and must complete fabrication, installation, testing, adjusting and commissioning before June 30, 2016. All chambers must be delivered to site for acceptance before March 31, 2016.
- .11 All work which generates excessive noise and vibration must be executed outside of the normal operating hours. Normal working hours are Monday through Friday – 08:00 to 17:00 hours. Work to be carried out outside operating hours must be scheduled in accordance with Departmental Representative.
- .12 The Supply Contractor must examine the site and be familiar and conversant with existing conditions likely to affect work.
- .13 The Supply Contractor must assume full responsibility for and execute the complete layout of the work to locations, lines and elevations at the project area.
- .14 Smoking within the building and within 7.5m of all air intakes is not permitted.
- .15 The metric system of measurement (SI) will be employed on this Contract.

1.2 WORK RESTRICTIONS

- .1 The Supply Contractor must become thoroughly familiar with and abide by all provisions and requirements of Pacific Agri-Food Research Centre: Operations, Safety and Security Procedures and Restrictions.
- .2 All access to the building will require daily sign-in at the Level 3 security desk.
- .3 All work within the facility will require full-attendance commissionaires irrespective of working hours. The Contractor must make minimum 48 hours advance arrangements with Departmental Representative for access and security.

1.3 PROJECT MEETINGS

- .1 Within 10 days after award of the Contract, the Departmental Representative will arrange a pre-construction meeting on site. The Departmental Representative, the Supply Contractor and representatives from Agriculture and Agri-Food Canada (AAFC Representative) will be in attendance.
- .2 During the course of on-site assembly work and prior to project completion, The Departmental Representative will request Construction Site Progress Meetings as required. The Departmental Representative, the Supply Contractor, Infrastructure Contractor, and AAFC Representative should be in attendance.

1.4 TEMPORARY ON - SITE SERVICES

- .1 Only the designated entrance must be used for personnel access to the site. The designated entry and exit will be via the front entrance at Level 3. Delivery Access to Level 2 can be through the loading area on the east side of the building. The Supply Contractor is required to use only the designated entrance to access the work site, for deliveries to the site, and as the exit for offsite disposal.
- .2 The Supply Contractor is allowed to park in the designated stalls at the facility parking lot.

- .3 The Supply Contractor must confine work and the operations of its employees to areas indicated on Contract documents. The Supply Contractor must not unreasonably encumber the premises with products. Storage space is to be limited to the area of construction. The Supply Contractor must provide and pay for all off-site storage as required.
- .4 Subject to coordination with Departmental Representative, electrical power within the facility may be used at no extra cost. There is no guarantee of uninterrupted power supply; the Supply Contractor will use this power source at its own risk. The Supply Contractor will not be compensated or submit any extra claim owing to any power failure. The Supply Contractor will be responsible for any other power source that they consider to be required for completing the project. The Supply Contractor will be responsible for all the cost of connecting and disconnecting from this power source after completion of project to the satisfaction of the Departmental Representative.
- .5 The Supply Contractor must supply its own compressed air, if required, for the duration of the contract.
- .6 The water supply is available for use by the Supply Contractor.
- .7 The Supply Contractor will have access to an on-site washroom (on the 2nd floor of the main building).
- .8 It is the intention of the Departmental Representative to supply the aforesaid temporary services where specified, however, in the event of any unforeseen occurrence, such temporary service may be discontinued, without notice, and without acceptance of any liability, for damage or delay, caused by such withdrawal of temporary services. Supply of temporary services is subject to the requirements of the facility and level of availability of existing services.

1.5 COORDINATION OF INFRASTRUCTURE WORK

- .1 The Supply Contractor must coordinate with the Infrastructure Contractor regarding the Construction Schedule for delivery dates.
- .2 The Supply Contractor must coordinate and provide the Infrastructure Contractor installation requirements, blocking and servicing requirements and confirm dimensional requirements, for installation and final services connections.
- .3 The Infrastructure Contractor will prepare the floor slab and floor drains, and provide final connection of the domestic cold and hot water, the chilled water supply and return, the power, the internet connection to the computer terminal, the RO Water and the ventilation to the growth chamber.
- .4 The Supply Contractor is to supply, install, test and commission the growth chambers after final connections. The Supply Contractor is to be responsible for chamber control and connection to the computer terminal that will run the control software.

1.6 HEALTH AND SAFETY REQUIREMENTS

- .1 Refer to Annex A3 for detail requirement.

1.7 SUBMITTALS

- .1 Schedule
 - .1 The Supply Contractor must submit to the Departmental Representative, within 14 working days after Award of Contract, a Project Schedule in form of a Bar (GANTT) Chart, for planning, monitoring and reporting of project progress.

- .2 The Supply Contractor must ensure that the detailed Project Schedule shows milestones and activity types and expands from the following items:
 - .1 Contract Award.
 - .2 Shop Drawings, Samples and Approvals.
 - .3 Fabrication.
 - .4 Installation.
 - .5 Mock-ups and Approvals.
 - .6 Testing, Commissioning
 - .7 Demonstration and Training.
- .2 Shop Drawings
 - .1 The Supply Contractor must submit to the Departmental Representative fabrication and installation shop drawings, samples, and data sheets for review. The Supply Contractor must submit these promptly 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 Time and no claim for extension by reason of such default will be allowed.
 - .2 The Supply Contractor must present shop drawings, product data, samples and mock-ups in SI Metric units.
 - .3 The Supply Contractor must notify the Departmental Representative in writing at time of submission, identifying deviations from the requirements of the Contract Documents and stating reasons for these deviations.
 - .4 The Supply Contractor must verify that field measurements and affected adjacent Work are co-ordinated.
 - .5 The Supply Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
 - .6 The Supply Contractor must indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the Work. Where articles or equipment attach or connect to other articles or equipment, the Supply Contractor must indicate that such items have been co-ordinated, regardless of the Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .7 The Supply Contractor must allow 15 working days for the Departmental Representative's review of each submission, unless noted otherwise.
 - .8 Adjustments made on shop drawings by the Departmental Representative are not intended to change Contract Price. If adjustments affect the value of Work, the Supply Contractor must state such in writing to Departmental Representative prior to proceeding with the Work.
 - .9 Submissions include details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
 - .10 The Supply Contractor must submit electronic copies of shop drawings, product data sheets and test reports for each requirement requested in specification

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- .11 sections and as the Departmental Representative may reasonably request.
The review of shop drawings by the Departmental Representative is for sole purpose of ascertaining conformance with general concept.
- .1 This review does not mean that the Departmental Representative approves the detailed design inherent in shop drawings, the responsibility for which must remain with the Supply Contractor submitting same, and such review does not relieve the Supply Contractor of the responsibility for errors or omissions in shop drawings or of responsibility for meeting the requirements of the Contract Documents.
- .2 Without restricting the generality of foregoing, the Supply Contractor is responsible for the dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for the co-ordination of Work of sub-trades.
- .12 The Supply Contractor must submit for review material, finishes and colour samples in duplicate. The Supply Contractor must label samples with origin and intended use. Reviewed and accepted samples will be kept onsite and will become the standard of workmanship and material against which installed Work will be verified.
- .13 The installation shop drawings must be signed and sealed by a professional engineer registered in BC who must provide the Model schedule of Assurance S-B and S-C as issued by APEGBC at completion of project.
- .3 Operation and Maintenance Manual for Growth Chambers
- .1 The Supply Contractor must provide 4 sets of the Hard Copy and 1 DVD Interactive pdf format of Operating and Maintenance Manual to the Departmental Representative.
- .2 Operation data to include:
- .1 Description of the equipment and its controls.
- .2 Description of operation of the equipment at all modes of use.
- .3 Operation instructions for the equipment and components.
- .4 Description of the actions to be taken in the event of equipment failure.
- .3 Maintenance data to include:
- .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
- .2 Data to include schedules of tasks, frequency, tools required and task time.
- .3 Description of specialties and accessories, giving the manufacturer's name, the type, model, year, capacity, and list of recommended spare parts.
- .4 Performance data to include:
- .1 Equipment performance verification test results.
- .2 Special performance data as specified.
- .5 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions.
- .6 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .7 Provide parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .8 Provide list of spare parts, current prices, and recommended quantities to be maintained in storage.

1.8 UTILITY REQUIREMENTS

- .1 Each Chamber must include an exhaust collar to connect to building central exhaust system.
- .2 Each Chamber must include a valve to connect to building compressed air system.
- .3 The Chamber must have junction box with an Ethernet port in order to connect to building network for the purpose of connecting equipment within the chamber to the building LAN.
- .4 All utilities must be either connected from the top of the unit at a location that can facilitate access and servicing from the front of the chamber. No Chamber should be designed with utility connection at the rear or side.
- .5 Except Chamber Type 1 and Type 2, an opening centre at the top panel must be provided for fire sprinkler installation. The Supply Contractor does not need to include the cost of installation. This Supply Contractor is to coordinate with the Infrastructure Contractor to provide an appropriate size opening and to reseal gaps between the pipes and the top panel after installation.

1.9 SITE CLEANING

- .1 The Supply Contractor must maintain the Work in a tidy condition, free from accumulation of waste products and debris.
- .2 The Supply Contractor must remove waste materials from site at daily regularly scheduled times or dispose of as directed by the Departmental Representative. The Supply Contractor must not burn waste materials on site, unless approved by the Departmental Representative.
- .3 The Supply Contractor must provide on-site containers for collection of waste materials and debris.
- .4 The Supply Contractor must provide and use marked separate bins for recycling. Refer to Section 1.10 - Waste Management and Disposal.
- .5 The Supply Contractor must dispose of waste materials and debris off site.

1.10 WASTE MANAGEMENT AND DISPOSAL

- .1 The Supply Contractor must:
 - .1 provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
 - .2 provide containers to deposit reusable and recyclable materials.
 - .3 locate containers in locations to facilitate the deposit of materials without hindering daily operations. Locations to be directed by the Departmental Representative.
- .2 The Supply Contractor must collect, handle, store on-site, and transport off-site, salvaged materials in separate condition. The Supply Contractor must transport them to approved and authorized recycling facility.
- .3 The Supply Contractor must not bury rubbish or waste materials. The Contractor must not dispose of waste, volatile materials, mineral spirits, or oil, paint thinner, into waterways, storm, or sanitary sewers.
- .4 The Supply Contractor must remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

- .5 The Supply Contractor must place materials defined as hazardous or toxic in designated containers, and dispose of them in accordance with environmental regulations.
- .6 The Supply Contractor must dispose of unused caulking material at an official hazardous material collections site as approved by the Departmental Representative.
- .7 The Supply Contractor must not dispose of unused sealant material into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .8 The Supply Contractor must fold up metal banding, flatten and place in designated area for recycling.

1.11 DEMONSTRATION AND TRAINING

- .1 Complete user training and full instructions on use of supplied equipment and systems must be provided on site at the Agriculture Agri-Food Canada (AAFC) - Pacific Agri-Food Research Centre (PARC) at Summerland, B.C for research staff, support staff and maintenance personnel (estimated 12 people) upon request of the Departmental Representative, within thirty (30) working days after the Commissioning of the equipment.
- .2 Demonstration and Instructions include:
 - .1 Demonstration of start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the equipment location.
 - .2 Instruction of personnel in phases of operation and maintenance using operation and maintenance manuals as basis of instruction.
 - .3 Review of the contents of the manual in detail to explain aspects of operation and maintenance.
 - .4 Preparation and insertion of additional data in operations and maintenance manuals when needed during instructions.
- .3 The Supply Contractor must allow an adequate amount of time for instruction of each item of equipment.

2.0 EXECUTION

2.1 INSTALLATION

- .1 The Supply Contractor must receive and off-load the equipment. The Supply Contractor must arrange forklift type equipment to remove equipment from common carrier highway transport truck(s).
- .2 The Supply Contractor must transport the equipment from the off-loading or storage area to the assembly area.
- .3 The Supply Contractor must uncrate equipment and dispose of crating material in accordance with specification requirement.
- .4 The Supply Contractor must assemble and make work the supplied equipment using qualified personnel.
- .5 The Supply Contractor must install Chambers according to the layout on the drawings and in accordance with the manufacturer's instructions.
- .6 Upon completion of installation, the Chambers must be in functioning condition as per performance requirements listed in this specification.

- .7 The installation by the Supply Contractor must include wiring for all the chambers together to the access point, and from the access point to the computer terminal within the project or overflow area. Exact location to be determined by the Departmental Representative. The Supply Contractor must provide the required most current control software in the computer terminal. The Ethernet connection to the computer terminal will be provided by the Infrastructure Contractor.

2.2 COMMISSIONING

- .1 The Supply Contractor must start up the installed equipment and verify the performance and operation is in accordance with the Contract documents and the design criteria and intent.
 - .1 The Supply Contractor must assure verification and functional testing of building power, all input devices, all controlled devices, all non-controlled devices, refrigeration and safety components and all special control sequences and devices.
 - .2 The Supply Contractor must perform a 24-hour test to demonstrate performance of all controlled parameters to their specified limits.
- .2 All work must be performed by qualified factory-trained and certified technicians with applicable accreditation.
- .3 The Supply Contractor must verify conformance to Contract requirements, confirm the installation meets requirements, provide all testing documents and records, provide a documented operator training program, and verify the accuracy of project record drawings and operating and maintenance manuals.
- .4 The Supply Contractor must set up and commission the control system and must assure full compatibility with the Growth Chambers.
- .5 The Departmental Representative will issue a Certificate of Substantial Completion when equipment, components and systems have been commissioned, and O&M training has been completed.
- .6 Should equipment, system components, and associated controls be incorrectly installed or malfunction during commissioning, the Supply Contractor must correct any deficiencies, and re-verify equipment and components within the nonfunctional system, including related systems as deemed required by the Departmental Representative to ensure effective performance.
- .7 The responsibility for corrective work, additional tests and further inspections to determine acceptability and proper performance of such items must be borne by the Supply Contractor.
- .8 Upon completion of Commissioning, the Supply Contractor must leave the equipment in normal operating mode.
- .9 The Supply Contractor must provide Performance Verification (PV) forms to be used for checks, running dynamic tests and adjustments to be carried out on equipment to ensure correct operation efficiently and function independently and interactively with building control system as intended with project requirements. PV report forms include those developed by the Supply Contractor to record measured data and readings taken during functional testing and Performance Verification procedures.
- .10 The Supply Contractor must conduct a final inspection of the Work to identify any

deficiencies and defects, and repair and retest as required to conform to the Contract Documents.

2.3 CLEANING AND ADJUSTING

- .1 Upon completion of the Work, the Supply Contractor must:
 - .1 Clean equipment and apparatus to sanitary condition, removing stains, spots, marks and dirt.
 - .2 Remove protective coverings and test and adjust operating equipment.
 - .3 Re-finish any damaged coatings and finishes.
 - .4 Inspect finishes, fitments and fixtures, and ensure specified workmanship and operation.

ANNEX A3

HEALTH AND SAFETY REQUIREMENTS

1. References
 - .1 Government of Canada.
 - .1 Canada Labour Code - Part II
 - .2 Canada Occupational Health and Safety Regulations.
 - .2 National Building Code of Canada (NBC):
 - .1 Part 8, Safety Measures at Construction and Demolition Sites.
 - .3 Canadian Standards Association (CSA) as amended:
 - .1 CSA Z797-2009 Code of Practice for Access Scaffold
 - .2 CSA S269.1-1975 (R2003) Falsework for Construction Purposes
 - .3 CSA S350-M1980 (R2003) Code of Practice for Safety in Demolition of Structures
 - .4 National Fire Code of Canada 2010 (as amended)
 - .1 Part 5 – Hazardous Processes and Operations and Division B as applicable and required.
 - .5 American National Standards Institute (ANSI):
 - .1 ANSI A10.3, Operations – Safety Requirements for Powder-Actuated Fastening Systems.
 - .6 Province of British Columbia:
 - .1 Workers Compensation Act Part 3-Occupational Health and Safety.
 - .2 Occupational Health and Safety Regulation
2. Related Sections
 - .1 Refer to Annex A2.
3. Workers' Compensation Board Coverage
 - .1 Comply fully with the Workers' Compensation Act, regulations and orders made pursuant thereto, and any amendments up to the completion of the work.
 - .2 Maintain Workers' Compensation Board coverage during the term of the Contract, until and including the date that the Certificate of Final Completion is issued.
4. Compliance with Regulations
 - .1 PWGSC may terminate the Contract without liability to PWGSC where the Contractor, in the opinion of PWGSC, refuses to comply with a requirement of the Workers' Compensation Act or the Occupational Health and Safety Regulations.
 - .2 It is the Contractor's responsibility to ensure that all workers are qualified, competent and certified to perform the work as required by the Workers' Compensation Act or the Occupational Health and Safety Regulations.

5. Submittals

- .1 Submit to Departmental Representative submittals listed for review. [in accordance with Section 013300]
- .2 Work effected by submittal shall not proceed until review is complete.
- .3 Submit the following:
 - .1 Health and Safety Plan.
 - .2 Copies of reports or directions issued by Federal and Provincial health and safety inspectors.
 - .3 Copies of incident and accident reports.
 - .4 Complete set of Material Safety Data Sheets (MSDS), and all other documentation required by Workplace Hazardous Materials Information System (WHMIS) requirements.
 - .5 Emergency Procedures.
- .4 The Departmental Representative will review the Contractor's site-specific project Health and Safety Plan and emergency procedures, and provide comments to the Contractor within [] days after receipt of the plan. Revise the plan as appropriate and resubmit to Departmental Representative.
- .5 Medical surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of work, and submit additional certifications for any new site personnel to Departmental Representative.
- .6 Submission of the Health and Safety Plan, and any revised version, to the Departmental Representative is for information and reference purposes only. It shall not:
 - .1 Be construed to imply approval by the Departmental Representative.
 - .2 Be interpreted as a warranty of being complete, accurate and legislatively compliant.
 - .3 Relieve the Contractor of his legal obligations for the provision of health and safety on the project.

6. Responsibility

- .1 Assume responsibility as the Prime Contractor for work under this contract.
- .2 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .3 Comply with and enforce compliance by employees with safety requirements of Contract documents, applicable Federal, Provincial, Territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

7. Health and Safety Coordinator

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- .1 The Health and Safety Coordinator must:
- .1 Be responsible for completing all health and safety training, and ensuring that personnel that do not successfully complete the required training are not permitted to enter the site to perform work.
 - .2 Be responsible for implementing, daily enforcing, and monitoring the site-specific Health and Safety Plan.
 - .3 Be on site during execution of work.
8. General Conditions
- .1 Provide safety barricades and lights around work site as required to provide a safe working environment for workers and protection for pedestrian and vehicular traffic.
 - .2 Ensure that non-authorized persons are not allowed to circulate in designated construction areas of the work site.
 - .1 Provide appropriate means by use of barricades, fences, warning signs, traffic control personnel, and temporary lighting as required.
 - .2 Secure site at night time [or provide security guard] as deemed necessary to protect site against entry.
9. Project/Site Conditions
- .1 Work at site will involve contact with:
 - .1 Multi-employer work site.
 - .2 Federal employees and general public.
10. Regulatory Requirements
- .1 Comply with specified codes, acts, bylaws, standards and regulations to ensure safe operations at site.
 - .2 In event of conflict between any provision of the above authorities, the most stringent provision will apply. Should a dispute arise in determining the most stringent requirement, the Departmental Representative will advise on the course of action to be followed.
11. Work Permits
- .1 Obtain specialty permit[s] related to project before start of work.
12. Filing of Notice
- .1 The General Contractor is to complete and submit a Notice of Project as required by Provincial authorities.
 - .2 Provide copies of all notices to the Departmental Representative.
13. Health and Safety Plan
- .1 Conduct a site-specific hazard assessment based on review of Contract documents, required work, and project site. Identify any known and potential health risks and safety hazards.
 - .2 Prepare and comply with a site-specific project Health and Safety Plan based on hazard assessment, including, but not limited to, the following:
 - .1 Primary requirements:
 - .1 Contractor's safety policy.
 - .2 Identification of applicable compliance

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- obligations.
 - .3 Definition of responsibilities for project safety/organization chart for project.
 - .4 General safety rules for project.
 - .5 Job-specific safe work, procedures.
 - .6 Inspection policy and procedures.
 - .7 Incident reporting and investigation policy and procedures.
 - .8 Occupational Health and Safety Committee/Representative procedures.
 - .9 Occupational Health and Safety meetings.
 - .10 Occupational Health and Safety communications and record keeping procedures.
- .2 Summary of health risks and safety hazards resulting from analysis of hazard assessment, with respect to site tasks and operations which must be performed as part of the work.
 - .3 List hazardous materials to be brought on site as required by work.
 - .4 Indicate Engineering and administrative control measures to be implemented at the site for managing identified risks and hazards.
 - .5 Identify personal protective equipment (PPE) to be used by workers.
 - .6 Identify personnel and alternates responsible for site safety and health.
 - .7 Identify personnel training requirements and training plan, including site orientation for new workers.
- .3 Develop the plan in collaboration with all subcontractors. Ensure that work/activities of subcontractors are included in the hazard assessment and are reflected in the plan.
 - .4 Revise and update Health and Safety Plan as required, and re-submit to the Departmental Representative.
 - .5 Departmental Representative's review: the review of Health and Safety Plan by Public Works and Government Services Canada (PWGSC) shall not relieve the Contractor of responsibility for errors or omissions in final Health and Safety Plan or of responsibility for meeting all requirements of construction and Contract documents.
14. Emergency Procedures
- .1 List standard operating procedures and measures to be taken in emergency situations. Include an evacuation plan and emergency contacts (i.e. names/telephone numbers) of:
 - .1 Designated personnel from own company.
 - .2 Regulatory agencies applicable to work and as per legislated regulations.
 - .3 Local emergency resources.
 - .4 Departmental Representative [site staff].
 - .2 Include the following provisions in the emergency procedures:
 - .1 Notify workers and the first-aid attendant, of the nature

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- and location of the emergency.
 - .2 Evacuate all workers safely.
 - .3 Check and confirm the safe evacuation of all workers.
 - .4 Notify the fire department or other emergency responders.
 - .5 Notify adjacent workplaces or residences which may be affected if the risk extends beyond the workplace.
 - .6 Notify Departmental Representative [site staff].
- .3 Provide written rescue/evacuation procedures as required for, but not limited to:
- .1 Work at high angles.
 - .2 Work in confined spaces or where there is a risk of entrapment.
 - .3 Work with hazardous substances.
 - .4 Underground work.
 - .5 Work on, over, under and adjacent to water.
 - .6 Workplaces where there are persons who require physical assistance to be moved.
- .4 Design and mark emergency exit routes to provide quick and unimpeded exit.
15. Hazardous Products
- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of hazardous materials, and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to the Departmental Representative and in accordance with the Canada Labour Code.
 - .2 Where use of hazardous and toxic products cannot be avoided:
 - .1 Advise Departmental Representative beforehand of the product(s) intended for use. Submit applicable MSDS and WHMIS documents as per [Section 013300].
 - .2 In conjunction with Departmental Representative, schedule to carry out work during "off hours" when tenants have left the building.
 - .3 Provide adequate means of ventilation in accordance with [Section 015100].
16. Asbestos Hazard
- .1 Carry out any activities involving asbestos in accordance with applicable Provincial regulations.
 - .2 Removal and handling of asbestos will be performed as indicated in Sections [024116] and [028210] [028211] [028212].
17. PCB Removals
- .1 Mercury-containing fluorescent tubes and ballasts which contain polychlorinated biphenyls (PCBs) are classified as hazardous waste.
 - .2 Remove, handle, transport and dispose of as indicated in Section [028400].
18. Removal of Lead-Containing Paints

- .1 All paints containing TCLP lead concentrations above 5 ppm are classified as hazardous.
- .2 Carry out demolition activities involving lead-containing paints in accordance with applicable Provincial regulations.

19. Electrical Safety Requirements

- .1 Comply with authorities and ensure that, when installing new facilities or modifying existing facilities, all electrical personnel are completely familiar with existing and new electrical circuits and equipment and their operation.
 - .1 Before undertaking any work, coordinate required energizing and de-energizing of new and existing circuits with Departmental Representative.
 - .2 Maintain electrical safety procedures and take necessary precautions to ensure safety of all personnel working under this Contract, as well as safety of other personnel on site.

20. Electrical Lockout

- .1 Develop, implement and enforce use of established procedures to provide electrical lockout and to ensure the health and safety of workers for every event where work must be done on any electrical circuit or facility.

SPEC NOTE:

Procedures specified for lockout need to be consistent with site procedures for existing facilities or equipment.

- .2 Prepare the lockout procedures in writing, listing step-by-step processes to be followed by workers, including how to prepare and issue the request/authorization form. Have procedures available for review upon request by the Departmental Representative.
- .3 Keep the documents and lockout tags at the site and list in a log book for the full duration of the Contract. Upon request, make such data available for viewing by Departmental Representative or by any authorized safety representative.

21. Overloading

- .1 Ensure no part of work is subjected to a load which will endanger its safety or will cause permanent deformation.

22. Falsework

- .1 Design and construct falsework in accordance with CSA S269.1-1975 (R2003).

23. Scaffolding

- .1 Design, construct and maintain scaffolding in a rigid, secure and safe manner, in accordance with CSA Z797-2009 and B.C. Occupational Health and Safety Regulations.

24. Confined Spaces

- .1 Carry out work in confined spaces in compliance with Provincial regulations.

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25. Powder-Actuated Devices .1 Use powder-actuated devices in accordance with ANSI A10.3 only after receipt of written permission from the Departmental Representative.
26. Fire Safety and Hot Work .1 Obtain Departmental Representative's authorization before any welding, cutting or any other hot work operations can be carried out on site.
- .2 Hot work includes cutting/melting with use of torch, flame heating roofing kettles, or other open flame devices and grinding with equipment which produces sparks.
27. Fire Safety Requirements .1 Store oily/paint-soaked rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
28. Fire Protection and Alarm System .1 Fire protection and alarm systems shall not be:
- .1 Obstructed.
- .2 Shut off.
- .3 Left inactive at the end of a working day or shift.
- .2 Do not use fire hydrants, standpipes and hose systems for purposes other than firefighting.
- .3 Be responsible/liable for costs incurred from the fire department, the building owner and the tenants, resulting from false alarms.
29. Unforeseen Hazards .1 Should any unforeseen or peculiar safety-related factor, hazard or condition become evident during performance of the work, immediately stop work and advise the Departmental Representative verbally and in writing.
30. Posted Documents .1 Post legible versions of the following documents on site:
- .1 Health and Safety Plan.
- .2 Sequence of work.
- .3 Emergency procedures.
- .4 Site drawing showing project layout, locations of the first-aid station, evacuation route and marshalling station, and the emergency transportation provisions.
- .5 Notice of Project.
- .6 Floor plans or site plans.
- .7 Notice as to where a copy of the Workers' Compensation Act and Regulations are available on the work site for review by employees and workers.
- .8 Workplace Hazardous Materials Information System (WHMIS) documents.
- .9 Material Safety Data Sheets (MSDS).
- .10 List of names of Joint Health and Safety Committee

members, or Health and Safety Representative, as applicable.

- .2 Post all Material Safety Data Sheets (MSDS) on site, in a common area, visible to all workers and in locations accessible to tenants when work of this Contract includes construction activities adjacent to occupied areas.
- .3 Postings should be protected from the weather, and visible from the street or the exterior of the principal construction site shelter provided for workers and equipment, or as approved by the Departmental Representative.

31. Meetings

- .1 Attend health and safety pre-construction meeting and all subsequent meetings called by the Departmental Representative.

32. Correction of Non-Compliance

- .1 Immediately address health and safety non-compliance issues identified by the Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance with health and safety issues identified.
- .3 The Departmental Representative may issue a "stop work order" if non-compliance of health and safety regulations is not corrected immediately or within posted time. The General Contractor/subcontractors will be responsible for any costs arising from such a "stop work order".

END OF SECTION

ANNEX B

BASIS OF PAYMENT

B.1 Financial Proposal Instructions

1. Pricing Requirements – Firm Price

The bidder must provide a separate firm price for each item listed in this Basis of Payment. The unit price and the details of calculations leading up to the total bid price must be clearly shown as a total dollar figure.

All equipment prices must include all items required by the full growth chamber system including any optional features, goods or services presented for point rating. The accompanying lot price includes delivery to Agriculture and Agri-Food Canada, at Level 2 of the Pacific Agri-Food Research Centre (PARC) at 4200 97 Highway, Summerland, B.C. , installation and commissioning either with the initial order or with subsequent optional item deliveries.

The cost(s) of any item(s) omitted from the quote(s) that are required to meet system requirements and specifications as described herein, are to be the sole responsibility of the Bidder.

2. The terms and conditions in B.2 and the proposed price will be included as Annex B - Basis of Payment in the resulting contract.

B.2 Resulting Annex B - Basis of Payment for the Contract

Agriculture and Agri-Food Canada (AAFC) requires a fully installed and functional Growth Chambers system. It is mandatory that the successful Contractor must supply, deliver, install & commission all equipment, accessories and materials necessary for a fully functional system. Any materials and equipment necessary for the proper operation of the system not specified or described shall be deemed as part of the specification.

All technological upgrades, such as new software versions, system ROM, firmware upgrades, etc., that are released after the system is ordered but before delivery and acceptance must be included at no additional charge. The cost of any item that is omitted but are required to meet the system requirements and specifications are the sole responsibility of the Contractor.

The prices must be Firm, in Canadian dollars, Customs duties and excise taxes are included and applicable Taxes are extra. FOB destination to Agriculture and Agri-Food Canada (AAFC), Level 2 Pacific Agri-Food Research Centre (PARC) at 4200 - 97 Highway, Summerland, B.C.

The schedule of milestones for which payments will be made in accordance with the Contract is as follows:

Solicitation No. - N° de l'invitation
EZ899-160422/A
Client Ref. No. - N° de réf. du client
EZ899-160422

Amd. No. - N° de la modif.
File No. - N° du dossier
VAN-5-38086

Buyer ID - Id de l'acheteur
VAN584
CCC No./N° CCC - FMS No./N° VME

B.3.1 INITIAL ORDER:

Unit No.	Description of deliverables	Qty	Firm Unit Price	Firm Total Price
1	Delivery of Goods Growth Chambers: Type 3 Model # _____ Type 4 Model # _____ Type 5 Model # _____ Type 6 Model # _____	4 2 3 1	\$_____/Ea \$_____/Ea \$_____/Ea \$_____/Ea	\$_____ \$_____ \$_____ \$_____
2	Installation, commissioning, testing and on-site training	1	\$_____/Lot	\$_____
			Total Firm Price for Initial Order:	\$_____

B.3.2 OPTIONAL GOODS AND SERVICES:
(Mandatory to submit pricing with bid submission)

Unit No.	Description of deliverables	A. Firm Unit Price if included with initial order	B. Firm Unit Price (up to June 30, 2017)
3	<p>Growth Chambers: Type 1 Model # _____ Estimated total quantity with initial order and/or during the option period = 7 units.</p> <p>Single unit cost for Installation, commissioning, testing and on-site training</p>	<p>\$ _____/Ea</p> <p>\$ _____/Lot</p>	<p>\$ _____/Ea</p> <p>\$ _____/Lot</p>
4	<p>Growth Chambers: Type 2 Model # _____ Estimated total quantity with initial order and/or during the option period = 2 units.</p> <p>Single unit cost for Installation, commissioning, testing and on-site training</p>	<p>\$ _____/Ea</p> <p>\$ _____/Lot</p>	<p>\$ _____/Ea</p> <p>\$ _____/Lot</p>
5	<p>Growth Chambers: Type 3 Model # _____ Estimated total quantity with initial order and/or during the option period = 4 units.</p> <p>Single unit cost for Installation, commissioning, testing and on-site training</p>	<p>\$ _____/Ea</p> <p>\$ _____/Lot</p>	<p>\$ _____/Ea</p> <p>\$ _____/Lot</p>
	Total Firm Price for Optional Goods and Services:	\$ _____	\$ _____

TOTAL BID PRICE (B.3.1 + B.3.2) \$

ANNEX C to PART 5 - 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 employees (combined work force includes: permanent full-time, permanent part-time and temporary employees [temporary employees only includes those who have worked 12 weeks or more during a calendar year and who are not full-time students]).
 - 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)

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ANNEX D

CERTIFICATE OF INSURANCE Page 1 of 2

Description and Location of Work For the supply, delivery, fabrication, installation and commissioning of New Growth Chambers at Agriculture and Agri-Food Canada at Level 2 of the Pacific Agri-Food Research Centre (PARC) at 4200 97 Highway, Summerland, B.C.	Contract No. EZ899-160422/A
	Project No.

Name of Insurer, Broker or Agent	Address (No., Street)	City	Province	Postal Code
Name of Insured (Contractor)	Address (No., Street)	City	Province	Postal Code
Additional Insured Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services				

Type of Insurance	Insurer Name and Policy Number	Inception Date D / M / Y	Expiry Date D / M / Y	Limits of Liability		
Commercial General Liability Umbrella/Excess Liability				Per Occurrence	Annual General Aggregate	Completed Operations Aggregate
				\$	\$	\$
Builder's Risk / Installation Floater				\$		
Pollution Liability				\$ <input type="checkbox"/> Per Incident <input type="checkbox"/> Per Occurrence		Aggregate \$
Professional Liability aka Errors and Omissions				\$		
Automobile Liability				\$ <input type="checkbox"/> Per Incident <input type="checkbox"/> Per Occurrence		Aggregate \$

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I certify that the above policies were issued by insurers in the course of their Insurance business in Canada, are currently in force and include the applicable insurance coverage's stated on page 2 of this Certificate of Insurance, including advance notice of cancellation / reduction in coverage.

Name of person authorized to sign on behalf of Insurer(s) (Officer, Agent, Broker)

Telephone number

Signature

Date D / M / Y

CERTIFICATE OF INSURANCE

Page 2 of 2

General

The insurance policies required on page 1 of the Certificate of Insurance must be in force and must include the insurance coverage listed under the corresponding type of insurance on this page.

The policies must insure the Contractor and must include Her Majesty the Queen in Right of Canada as represented by the Minister of Public Works and Government Services as an additional Insured.

The insurance policies must be endorsed to provide Canada with not less than thirty (30) days notice in writing in advance of a cancellation of insurance or any reduction in coverage.

Without increasing the limit of liability, the policies must protect all insured parties to the full extent of coverage provided. Further, the policies must apply to each Insured in the same manner and to the same extent as if a separate policy had been issued to each.

Commercial General Liability

The insurance coverage provided must not be substantially less than that provided by the latest edition of IBC Form 2100.

The policy must either include or be endorsed to include coverage for the following exposures or hazards if the Work is subject thereto:

- (a) Removal or weakening of support of any structure or land whether such support be natural or otherwise if the work is performed by the insured contractor
- (b) Employers' Liability (or confirmation that all employees are covered by Worker's compensation (WSIB) or similar program).
- (c) Testing and Commissioning

The policy must have the following minimum limits:

- (a) **\$5,000,000** Each Occurrence Limit;
- (b) **\$10,000,000** General Aggregate Limit per policy year if the policy contains a General Aggregate; and
- (c) **\$5,000,000** Products/Completed Operations Aggregate Limit.

Umbrella or excess liability insurance may be used to achieve the required limits.

Builder's Risk / Installation Floater

The insurance coverage provided must not be less than that provided by the latest edition of IBC Forms 4042 and 4047.

The policy must permit use and occupancy of any of the projects, or any part thereof, where such use and occupancy is for the purposes for which a project is intended upon completion.

The policy may exclude or be endorsed to exclude coverage for loss or damage caused by asbestos, fungi or spores, cyber and terrorism.

The policy must have a limit that is **not less than the sum of the contract value** plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Canada at the site of the project to be incorporated into and form part of the finished Work. If the value of the Work is changed, the policy must be changed to reflect the revised contract value.

The policy must provide that the proceeds thereof are payable to Canada or as Canada may direct in accordance with GC10.2, "Insurance Proceeds" (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2900D/2>).

Contractors Pollution Liability

The policy must have a limit usual for a contract of this nature, but not less than **\$1,000,000** per incident or occurrence and in the aggregate.

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 \$2,000,000 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.

Automobile Liability Insurance

1. The Contractor must obtain Automobile 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.
2. The policy must include the following:
 - a. Third Party Liability - \$2,000,000 Minimum Limit per Accident or Occurrence
 - b. Accident Benefits - all jurisdictional statutes
 - c. Uninsured Motorist Protection
 - d. Notice of Cancellation: The Insurer will endeavour to provide the Contracting Authority thirty (30) days written notice of cancellation.

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SUBMISSION FORM 1

Bidder's Submission Information		
Bidder's full legal name		
Authorized Representative of Bidder for evaluation purposes (e.g., clarifications)	Name	
	Title	
	Address	
	Fax #	
	Email	
Bidder's Procurement Business Number (PBN) [see the Standard Instructions 2003]		
Jurisdiction of Contract: Province in Canada the bidder wishes to be the legal jurisdiction applicable to any resulting contract (if other than as specified in solicitation)		
Federal Contractors Program for Employment Equity (FCP EE) Certification:	See Annex C	
COMPLETE LIST OF NAMES OF ALL INDIVIDUALS WHO ARE CURRENT BOARD OF DIRECTORS OF THE BIDDER:		
NAME	TITLE	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
On behalf of the Bidder, by signing below, I confirm that I have read the entire bid solicitation including the documents incorporated by reference into the bid solicitation and I certify that: 1. The Bidder considers itself and its products able to meet all the mandatory requirements described in the bid solicitation; 2. This bid is valid for the period requested in the bid solicitation; 3. All the information provided in the bid is complete, true and accurate; and 4. If the Bidder is awarded a contract, it will accept all the terms and conditions set out in the resulting contract clauses included in the bid solicitation.		
Signature of Authorized Representative of Bidder		

SUBMISSION FORM 2

TEMPLATE FOR BIDDERS QUALIFICATION STATEMENT

This document is intended to provide information on the capacity, skill, and experience of the Contractor. Contractor may supplement information requested with additional sheets if required.

Item	Description	Response
1.0	General Company information	(10 points)
1.1	Company Name:	
1.2	Years in Growth Chamber Business: Company must have at least 15 years of experience in the production, installation and support of growth chambers. MANDATORY The contractor must have continuous proven experience in the manufacture and installation of Plant Growth Chambers within the last five years	COMPLY: YES / NO (Describe)
1.3	Total Number of Employees:	
1.4	Location of Main Office :	
1.5	Location of Branch Office(s) :	
1.6	Location of Main / Branch Office servicing this project:	
1.7	Location of Factory producing equipment for this project:	
1.8	Management Structure: It is requested that the Bidder provide a table showing company management structure	

DEMONSTRATED EXPERIENCE		
Item	Project One	(12 points)
2.1.0	Relevant Project Experience The Bidder is requested to provide a brief description of a similar project. Points will be assessed based on similarity in scope and size, purpose and location.	
2.1.1	Client's Name:	
2.1.2	Client's Location:	
2.1.3	Contract Value:	
2.1.4	Project Duration:	
2.1.5	Date Completed:	
2.1.6	On time and on budget?	
2.1.7	Description of the Project:	
2.1.8	Chamber Types provided	

	(size, function,etc.)	
2.1.9	Reference: May be contacted to verify information provided above..	
2.1.9.1	Name of reference	
2.1.9.2	Position:	
2.1.9.3	Role in Project:	
2.1.9.4	Phone Number:	
2.1.9.5	Email Address:	

Item	Project Two	(12 points)
2.2.0	Relevant Project Experience The Bidder is requested to provide a brief description of a similar project. Points will be assessed based on similarity in scope and size, purpose and location.	
2.2.1	Client's Name:	
2.2.2	Client's Location:	
2.2.3	Contract Value:	
2.2.4	Project Duration:	
2.2.5	Date Completed:	
2.2.6	On time and on budget?	
2.2.7	Description of the Project:	
2.2.8	Chamber Types provided (size, function,etc.)	
2.2.9	Reference: May be contacted to verify information provided above..	
2.2.9.1	Name of reference	
2.2.9.2	Position:	
2.2.9.3	Role in Project:	
2.2.9.4	Phone Number:	
2.2.9.5	Email Address:	

Item	Project Three	(12 points)
2.3.0	Relevant Project Experience The Bidder is requested to provide a brief description of a similar project. Points will be assessed based on similarity in scope and size, purpose and location.	
2.3.1	Client's Name:	
2.3.2	Client's Location:	
2.3.3	Contract Value:	
2.3.4	Project Duration:	
2.3.5	Date Completed:	
2.3.6	On time and on budget?	
2.3.7	Description of the Project:	
2.3.8	Chamber Types provided (size, function,etc.)	
2.3.9	Reference: May be contacted to verify	

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	information provided above.	
2.3.9.1	Name of reference	
2.3.9.2	Position:	
2.3.9.3	Role in Project:	
2.3.9.4	Phone Number:	
2.3.9.5	Email Address:	

Item	Project Four	(12 points)
2.4.0	Relevant Project Experience The Bidder is requested to provide a brief description of a similar project. Points will be assessed based on similarity in scope and size, purpose and location.	
2.4.1	Client's Name:	
2.4.2	Client's Location:	
2.4.3	Contract Value:	
2.4.4	Project Duration:	
2.4.5	Date Completed:	
2.4.6	On time and on budget?	
2.4.7	Description of the Project:	
2.4.8	Chamber Types provided (size, function,etc.)	
2.4.9	Reference: May be contacted to verify information provided above.	
2.4.9.1	Name of reference	
2.4.9.2	Position:	
2.4.9.3	Role in Project:	
2.4.9.4	Phone Number:	
2.4.9.5	Email Address:	

Item	Project Five	(12 points)
2.5.0	Relevant Project Experience The Bidder is requested to provide a brief description of a similar project. Points will be assessed based on similarity in scope and size, purpose and location.	
2.5.1	Client's Name:	
2.5.2	Client's Location:	
2.5.3	Contract Value:	
2.5.4	Project Duration:	
2.5.5	Date Completed:	
2.5.6	On time and on budget?	
2.5.7	Description of the Project:	
2.5.8	Chamber Types provided (size, function,etc.)	
2.5.9	Reference: May be contacted to verify information provided above.	

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2.5.9.1	Name of reference	
2.5.9.2	Position:	
2.5.9.3	Role in Project:	
2.5.9.4	Phone Number:	
2.5.9.5	Email Address:	

Item	Description	
3.0	Bidder's Personnel Proposed for the Summerland Project	
3.1	Key Office Personnel proposed for the Project. (5 points)	
	Key office personnel should have demonstrated experience in dealing with similar projects.	<i>Using the attached Form 2A, the Bidder is requested to describe the role of each proposed individual in the company and to describe their proposed contribution to this project. It is requested also that the Bidder attach the resume of each individual clearly highlighting where experience and training coincides with the above projects given as references.</i>
3.2	Installation and Commissioning Personnel (10 points)	
	All installers and commissioning agents must be factory trained and certified with a minimum of 5 years related experience installing and commissioning this type of equipment.	<i>Using the attached Form 2B, the Bidder is requested to describe the role of each proposed installation and commissioning resource and to describe their involvement with this project. It is requested also that the Bidder attach the resume of each individual clearly highlighting where experience and training coincides with the above projects given as references.</i>
3.3	Maintenance and Support Services during the Warranty Period (15 points)	
	<p>Maintenance and Support Services must be consistent with the requirements described in the Annex A1, Technical Requirements, article 1.3 and in support of the Bidder's proposed solution.</p> <p>On-site support availability and an appropriate problem reporting and response procedure should be provided, as well as an issues escalation procedure.</p> <p>Maintenance and Support Services personnel should be factory trained to maintain and support the equipment proposed.</p>	<p><i>It is requested that the Bidder include a description of its maintenance and support services, which must be consistent with all the requirements described in the Annex A1 , Technical Requirements, Article 1.3. At a minimum, it is requested that the Bidder describe:</i></p> <ul style="list-style-type: none"> <i>(a) its problem reporting and response procedures;</i> <i>(b) its escalation procedures (including the titles of key individuals);</i> <i>(c) its on-site support availability and timing; and</i> <i>(d) any enhancements to the basic requirements that the Bidder is offering</i> <p><i>Using the attached Form 2C, the Bidder is requested also to describe the role of key maintenance resources in the company and to describe their involvement with this project. It is requested also that the Bidder attach the resume of each maintenance and support individual clearly highlighting their credentials and work experience and training.</i></p>

TOTAL POINTS: 100

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Form 2A: Key Office Personnel proposed for the Project.

(Please supply one grid for each proposed individual along with their resume)

Name:	
Title:	
Years of service at this company:	
Years of service with similar projects:	
Relevant experience to this project:	
Contribution to Summerland project:	

Form 2B: Installation and Commissioning Personnel Proposed for this Project.

(Please supply one grid for each proposed individual along with their resume)

Name:	
Title:	
Credentials: agents must be factory trained and certified with a minimum of 5 years related experience installing and commissioning this type of equipment.	COMPLY: YES / NO Describe and provide supporting documentation including copy of the certification, where applicable. Certificates not provided with the bid must be submitted to the Contracting Authority within 24 hours of request or before Contract Award, whichever is sooner.
Years of service at this company:	
Years of service with similar projects:	
Relevant experience to this project:	
Contribution to Summerland project:	

Form 2C: Maintenance and Support Services proposed for the Project during the Warranty Period.

(Please supply one grid for each proposed individual along with their resume)

Name:	
Title:	
Years of service at this company:	
Credentials: Any education, certification relevant to this project:	
Years of service with similar projects:	
Relevant experience to this project:	
Contribution to Summerland project:	

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SUBMISSION FORM 3

ANNEX A1 GROWTH CHAMBER TECHNICAL SPECIFICATIONS

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
1.0	GENERAL				
1.1	REFERENCES				
1.1.1	American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)				
1.1.1.1	MANDATORY The deliverables supplied must meet all applicable standards as detailed in ANSI/ASME B16.26-[2001], Cast Copper Alloy Fittings for Flared Copper Tubes.	Comply YES/NO			
1.1.1.2	MANDATORY The deliverables supplied must meet all applicable standards as detailed in ANSI/ASME B16.29-[2001], Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings-DWV.	Comply YES/NO			
1.1.2	American National Standards Institute/National Fire Protection Association (ANSI/NFPA)				
1.1.2.1	MANDATORY The deliverables supplied must meet all applicable standards as detailed in	Comply YES/NO			

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	ANSI/NFPA 255-[2000], Standard Method of Test of Surface Burning Characteristics of Building Materials.				
1.1.3	American Society for Testing and Materials International, (ASTM)				
1.1.3.1	MANDATORY The deliverables supplied must meet all applicable standards as detailed in ASTM A 167-99(2009) Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.	Comply YES/NO			
1.1.3.2	MANDATORY The deliverables supplied must meet all applicable standards as detailed in 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.	Comply YES/NO			
1.1.3.3	MANDATORY The deliverables supplied must meet all applicable standards as detailed in ASTM A 480/A 480M-14b, Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip. Finish for sheet: No. 4 Finish-	Comply YES/NO			

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	General purpose polished finish, one or both sides.				
1.1.3.4	MANDATORY The deliverables supplied must meet all applicable standards as detailed in 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.	Comply YES/NO		.	
1.1.3.5	MANDATORY The deliverables supplied must meet all applicable standards as detailed in ASTM B 88M-05, Standard Specification for Seamless Copper Water Tube [Metric].	Comply YES/NO			
1.1.3.6	MANDATORY The deliverables supplied must meet all applicable standards as detailed in ASTM B 280-13, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.	Comply YES/NO			
1.1.3.7	MANDATORY The deliverables supplied must meet all applicable standards as detailed in ASTM E 84-15a, Standard Test Method for Surface Burning Characteristics of Building Materials.	Comply YES/NO			

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
1.1.3.8	MANDATORY The deliverables supplied must meet all applicable standards as detailed in ASTM E 162-13, Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.	Comply YES/NO			
1.1.4	Canadian General Standards Board (CGSB)				
1.1.4.1	MANDATORY The deliverables supplied must meet all applicable standards as detailed in CAN/CGSB-19.13-M87, Sealing Compound One-Component, Elastomeric, Chemical Curing.	Comply YES/NO			
1.1.5	Canadian Standards Association (CSA International)				
1.1.5.1	MANDATORY The deliverables supplied must meet all applicable standards as detailed in CSA C22.2 No.137-M1981(R2014), Electric Luminaires for Use in Hazardous Locations.	Comply YES/NO			
1.1.6	Underwriters' Laboratories of Canada				
1.1.6.1	MANDATORY The deliverables supplied must meet all applicable standards as detailed in CAN/ULC-S704-2011, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.	Comply YES/NO			

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
1.1.6.2	MANDATORY The deliverables supplied must meet all applicable standards as detailed in CAN/ULC-S705.1-2011, Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.	Comply YES/NO			
1.2	QUALITY ASSURANCE:				
1.2.1	MANDATORY Electrical Certification: 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.	Comply YES/NO		a) Certifying organization(s) Name each organization and equipment certified: _____ b) Expiry Date of certification(s) Detail as above. dd ____ mm ____ yyyy c) Proof of Certification provided in bid: YES / NO Proof must be provided within 24 hours of request or before Contact award, whichever is sooner.	_____
1.2.2	MANDATORY Quality Standards: The Manufacturer must ensure that a Nationally Recognized quality program, such as ISO9001, is used in the order, design and manufacturing processes of the Growth Chambers and all related	Comply YES/NO		a) Certifying organization(s) Name each organization and equipment certified: _____ b) Expiry Date of certification(s) Detail as above.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	equipment.			dd ____ mm ____ yyyy ____ c) Proof of Certification provided in bid: YES / NO Proof must be provided within 24 hours of request or before Contact award, whichever is sooner.	
1.2.3	MANDATORY Fabrication Quality: The Contractor must supply a photo record during fabrication in the factory at the interval(s) or milestone(s) to be determined by the Departmental Representative. The Departmental Representative also has the right to visit the factory at any point of time during fabrication to review fabrication quality	Comply YES/NO		Location of Factory: _____	
1.3	WARRANTY:				
1.3.1	MANDATORY Manufacturer must provide equipment and labour warranty for a minimum of 24 months from the date of commissioning. The warranty must be a comprehensive warranty that covers all major components of the growth chamber including but not limited to cabinet construction materials, controllers,	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of warranty and support services provided, including the number of years of diagnostic and troubleshooting services. If parts of the system have different warranties, this must be described and all parts of the	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	compressors, evaporators and all optional equipment provided with the growth chamber. The warranty must include parts and labour for a minimum of the first 24 months. Details of warranty must be provided as part of the operation and maintenance manual.			system must have a minimum 24 month warranty. Compliance will be assessed on the basis of the Bidder's response.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	The Bidder will receive 5 points if the electronic control system has an additional minimum 36 month warranty. The Bidder will receive another additional 5 points if the electronic control system has an additional minimum 48 month warranty.	
1.3.2	MANDATORY Diagnostic and Troubleshooting Services An additional 3 years of diagnostic and troubleshooting services must be provided.	Comply YES/NO		Bidder is requested to provide a description of the diagnostic and troubleshooting services to be provided.	
1.4	UTILITY REQUIREMENTS				
1.4.1	MANDATORY Electrical: Chambers must be designed for the following Electrical Service: 60Hz: 120/208-3 phase-60Hz-4 wire plus ground.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the electrical requirements of their system.	
1.4.2	MANDATORY Water: Chambers must be designed with water line connections on the top of the chamber. The chambers must	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the water line requirements of their system.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	have a single connection line for all hose bibs for the purpose of controlled irrigation; this must be connected to the tempered water system and will be pressure reduced. All additional hose bibs (not connected to the automated watering system) must have an additional connection line that will be connected to the standard water supply and will not be pressure reduced.				
1.5	SOURCE QUALITY CONTROL				
1.5.1	MANDATORY All chamber types must be manufactured by one single source.	Comply YES/NO			
1.5.2	MANDATORY 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.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the manufacturer's fabrication and installation as well as the credentials of its installation personnel	
2.0	PRODUCTS				
2.1	LOCAL CONTROL SYSTEM				
2.1.1	General Requirements:				
2.1.1.1	MANDATORY All chambers must be equipped with a control system designed specifically for research	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of its system's	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	horticultural and agricultural and entomological use with all equipment and enclosures suitably designed for the electrical and climate conditions of these applications including, but not limited to, precise temperature regulation and controlled lighting and humidity.			suitability for research horticultural, agricultural and entomological use.	
2.1.1.2	MANDATORY Control system must have, at a minimum, an LCD touch screen with readouts of relevant values.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of its system's interface.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	Points given on the basis of screen size, colour output, resolution.	
2.1.1.3	MANDATORY All chambers must share the same control system	Comply YES/NO			
2.1.1.4	MANDATORY The control system must be capable of storing a minimum of 10 real-time user-entered programs with a minimum of 15 minute program resolution. Daily programs must have the ability to be linked to simulate multi day, or seasonal programs.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the control system provided.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 30 points	Points given on the basis of: a) Whether there are more than 10 user-entered programs (up to 10 points) b) Resolution of programs	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
				(min/sec) (up to 10 points) c) Seasonal program simulation (up to 10 points).	
2.1.1.5	MANDATORY The controller must allow the following adjustments at both the chamber and remotely: temperature, humidity levels, automated watering schedule, and light level set-points.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the controller provided clearly indicating that the controller allows adjustments at both the chamber and remotely.	
2.1.1.6	MANDATORY Programs must be able to be entered via the controller's local control system, and via a remote desktop computer.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the system's program entry:	
2.1.1.7	MANDATORY Programs must be capable of transitioning from conditions in either step mode or ramp mode or both. POINT RATED Step and ramp is preferable to just step or just ramp.	Comply YES/NO			
			Up to 50 points	Step Mode?: YES / NO (5 points) Ramp Mode?: YES / NO (20 points) Both Modes?: YES / NO (25 points) Must have both to get full 50 points	
2.1.1.8	Control System MANDATORY The control system must be accessed and managed through a networked PC server provided by the Contractor (see 2.1.1.9), which provides the primary operator	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of control system's connection to the centralized control system, including confirmation of the	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	interface and performs other housekeeping tasks such as Data Archiving and backup of configuration and settings. Chambers must be connected to the central PC for centralized control of all controlled parameters. This must include a PC, software that is updated to the latest version, and all controllers required for running the chambers through the centralized Control system.			upgrade to the current software version, and all controllers required for running the chambers through the centralized control system.	
	POINT RATED It is desirable that the chambers be connected to and run by the existing Argus Titan system; however, if this is not possible, another control system (to be provided by the contractor) will be evaluated if connection to the Argus system is not possible.	Possible to connect to the Argus Titan YES /NO	Up to 40 points	Connection to the existing Argus system will secure the 40 points available because the details of the system are already known; however if connection to the Argus system is not possible, then the details of how the control system operates and details of its capabilities will be assessed and awarded points.	
2.1.1.9	MANDATORY The contractor must provide the networked desktop computer to run the control system and data collection services.	Comply YES/NO			
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	It is requested that full information be provided on the computer that would be supplied including Processor, RAM, size of hard drive, monitor, keyboard, mouse etc.). To get full points all of these	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.1.2	Data Logging and Graphing:			parts should be reasonably up to date and have suitable storage capacity for ongoing data collection from multiple sources.	
2.1.2.1	MANDATORY All controlled parameters must be recordable to provide a log of actual experimental results vs set values. Stored data must be transferable to a desktop computer via a network-connected PC.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of its Data logging and Graphing capabilities	
2.1.2.2	POINT RATED The Bidder may receive points for additional value added features, goods or services. MANDATORY Program must enable graphing to allow users to view historical data in graph form or compare programmed performance to actual performance.	Comply YES/NO	Up to 10 points	Points given on the basis of ease of transforming, manipulating, and exporting data, etc Bidder is requested to substantiate its compliance by providing details of its system's graphing capabilities:	
2.1.3	Alarms:				
2.1.3.1	MANDATORY System must incorporate floating alarms tracking temperature and must have the ability to be configured for other controlled parameters such as, but not limited to, humidity or lighting.	Comply YES/ NO		Bidder is requested to substantiate its compliance by providing details of its system's alarm capabilities:	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.1.3.2	MANDATORY Alarm set points must be programmable on a per experiment basis and determination of action required when an alarm is activated must also be programmable.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of its system's alarm set points capabilities:	
2.1.3.3	MANDATORY Alarms must be logged for access by viewing on the local control unit, and via a network-connected PC.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of Alarm log access.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 15 points	Points will be awarded based on how the alarms are viewed on local control unit (lights, sound, LCD readout etc.)	
2.1.3.4	MANDATORY Alarms must have programmable alarm handling features such as sending out automated email or phone notifications to the user.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of programmable alarm handling features:	
2.1.4	Security:				
2.1.4.1	MANDATORY Multiple password-protected levels (a minimum of three discrete levels) must be provided for users, administrators and service personnel.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of its system's password protection:	
2.1.5	User Control:				
2.1.5.1	MANDATORY The computer's networked controller must include	Comply YES/NO		Bidder is requested to substantiate its compliance by	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	individual logon capabilities that would allow end-users to control their own chambers, but not to manipulate the settings of other chambers for which they are not authorized.			providing details of User Control capabilities; among other things, controller will be evaluated on a) ability for a user to control their chamber; b) ability to prevent another unauthorized user from controlling the chamber	
2.1.6	Trouble Shooting:				
2.1.6.1	MANDATORY On board diagnostics screen must allow for service personnel to view all inputs and outputs including access to the service life of components including lamp burning hours, valve cycle numbers and similar component functioning.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of Trouble Shooting capabilities:	
2.1.7	Communications:				
2.1.7.1	MANDATORY Controller must be shipped communications ready for hook-up to a local area network.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of Communications hook-up readiness:	
2.1.8	Auto Watering System:				
2.1.8.1	MANDATORY Must have hose bib connection and auxiliary switch, terminated in control panel, for timed control of automatic watering.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of its auto watering system:	
2.1.9	Surge Protection:				
2.1.9.1	MANDATORY The controller must include surge protection and uninterrupted power supply (UPS).	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of surge	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	for continuous operation of the controller and data logging during power interruptions.			protection and UPS:	
2.2	CHAMBER SPECIFICATIONS			The dimensions specified here will allow the growth chambers to fit into the renovation configuration designed by the architect. Should the bidder specify alternate dimensions to the ones below (and if these dimensions and their alternate layout are acceptable to AAFC), it must submit full altered architectural, mechanical and electrical plans to accommodate the changes at its own expense.	
2.2.1	Service Connections – all chamber types				
2.2.1.1	MANDATORY All service connections must be made from the top front of the chambers since they will be placed side by side and back to back.	Comply YES/NO			
2.2.2	Growth Chambers Types 1 & 2				
2.2.2.1	Recommended Approximate Exterior Dimensions: 250 W x 90 D x 270H (cm) nominal	Comply YES/NO			
	POINT RATED The Bidder may receive points for additional value added		Up to 50 points	Dimensions Bid: W _____ cm D _____ cm	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	features, goods or services.			H _____ cm Points will be allocated on the basis of how close the bid dimensions are to the recommended dimensions.	
2.2.2.2	Convertibility of Tiers: MANDATORY Must be able to be easily converted by the user from single tier lit shelving units to at least three tier lit shelving units.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the conversion from single to multiple lit shelving units:	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	Points will be awarded on the basis of the ease of convertibility.	
2.2.2.3	MANDATORY Minimum Interior Volume: 2.5m ³	Comply YES/NO			
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	Growth chamber bid: _____ m ³ Points will be awarded for chambers exceeding the minimum volume.	
2.2.2.4	MANDATORY Minimum Lighted Growth Area: Single tier configuration = 1.7m ² Two tier configuration = 3.4m ² Three tier configuration = 5.1m ²	Comply YES/NO			
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 30 points	Bidder's Lighted Growth Area: Single tier configuration = _____ m ² Two tier configuration = _____ m ² Three tier configuration = _____ m ²	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.2.2.5	<p>MANDATORY Minimum Growth Height: Single tier configuration = 1500mm Two tier configuration = 600mm Three tier configuration = 350mm</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>m² Points will be awarded for chambers exceeding the minimum.</p> <p>Bidder's Growth Height: Single tier configuration = mm Two tier configuration = mm Three tier configuration = mm Points will be awarded for chambers exceeding the minimum.</p>	
2.2.2.6	<p>Shelving units: MANDATORY Shelving units must be constructed from corrosion resistant metal. Shelves should have metal mesh work surface for stable support of small plant pots The individual shelves must be easily adjustable in height and be removable.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by providing details of the provided shelves:</p>	
2.2.2.7	<p>Cabinet Construction: MANDATORY Chambers must be</p>	Comply YES/NO	Up to 20 points	<p>Points will be awarded on the basis of adjustability increment and range, ease of adjustment, work surface structure, dimensions of work surface, and removability.</p> <p>Bidder is requested to substantiate its compliance by</p>	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications. POINT RATED The Bidder may receive points for additional value added features, goods or services.			providing details of the design for horticultural, agricultural, and entomological research.	
			Up to 50 points	Cabinet exterior material: Cabinet interior material: Insulation: Cabinet exterior finishes: Cabinet interior finishes: _____ Points will be awarded based on the information provided above with regards to the types of materials used in the chamber construction.	
2.2.2.8	Wall Sanitation: MANDATORY Wall panels must be easy to sanitize between chamber uses.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of sanitation procedures.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 40 points	Points will be assessed on the basis of aspects such as removable panels, ease of removability, whether have to empty entire chamber etc.	
2.2.2.9	Doors and Window: MANDATORY Doors must provide easy and secure access to chambers. Observation windows are desirable.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing a description of the access to the chambers.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 30 points	Points will be awarded for: a) Number and size of doors(up to 5 points); b) Type of closures (up to 5 points); c) Ability to lock (up to 5 points); d) Observation windows (where applicable: double pane, light tight covers, etc.) (up to 15 points)	
2.2.2.10	Control Panel: MANDATORY Must be located on left hand or right hand side of door on front of chamber.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the control panel position.	
2.2.2.11	Legs: MANDATORY Chambers must have adjustable leg height to suit uneven floor level.	Comply YES/NO			
2.2.2.12	Additional Equipment Provisions:				
2.2.2.12.1	MANDATORY Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs (see 1.4.2 above)	Comply YES/NO			
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 30 points	The bidder will receive points based on its description of what is provided with the growth chamber. (How many ports, receptacles, hose bibs, spigots and the size, placement etc. 10 points for each type a-d)	
2.2.2.12.2	POINT RATED Chambers should be equipped with following additional equipment:		Up to 20 points	These features are considered as desirable. The bidder will receive points based on its description of	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)			what is provided with the growth chamber. a) Ethernet ports (up to 15 points) b) Other provisions or functionality (up to 5 points)	
2.2.3	Growth Chambers Type 3				
2.2.3.1	Recommended Approximate External Dimensions: 350 W x 175 D x 280 H (cm) nominal. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO			
			Up to 50 points	Dimensions Bid: W ____ cm D ____ cm H ____ cm Points will be allocated on the basis of how close the bid dimensions are to the recommended dimensions.	
2.2.3.2	MANDATORY Chamber must have a central aisle, with growth area on both sides of aisle.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the chamber.	
2.2.3.3	Convertibility of Tiers: MANDATORY Chamber must be able to be easily converted by the user from single tier lit shelving units to at least three tier lit shelving units.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the conversion from single to multiple lit shelving units.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	Points will be awarded on the basis of the ease of convertibility.	
2.2.3.4	MANDATORY Minimum Interior Volume: 9m ³	Comply YES/NO			
	POINT RATED The Bidder may receive		Up to 10	Minimum Interior Volume of	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	points for additional value added features, goods or services.		points	growth chamber bid: _____ m^3 Points will be awarded for chambers exceeding the minimum volume.	
2.2.3.5	<p>MANDATORY Minimum Lighted Growth Area: Single tier configuration = $2.2m^2$ Two tier configuration = $4.3m^2$ Three tier configuration = $6.4m^2$</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>Bidder's Lighted Growth Area: Single tier configuration = _____m^2 Two tier configuration = _____m^2 Three tier configuration = _____m^2 Points will be awarded for chambers exceeding the minimum.</p>	
2.2.3.6	<p>MANDATORY Minimum Growth Height (not including collection trays): Single tier configuration = 1500mm Two tier configuration = 750mm Three tier configuration = 500mm</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>Bidder's Growth Height Capacity: Single tier configuration = _____mm Two tier configuration = _____mm Three tier configuration = _____mm Points will be awarded for chambers exceeding the</p>	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.2.3.7	MANDATORY Chambers must be seismically secured to the floor slab. All edges of the chambers must be sealed tight against the floor slab to provide water containment.	Comply YES/NO		minimum. Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.3.7.1	MANDATORY Sealants must be compatible with the wall panel material and must be multi-component chemical cure sealants (for total submersion sealing for possibility of standing water), must conform to CAN/CGSB-2-19.24-M90 (TT-00227E-Type 11, Class A) standard sealing compounds and as otherwise specified to exceed that standard;	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.3.7.2	MANDATORY Sealants must bear, in addition to the product identification name, the qualification number when tested under CAN/CGSB standard, Type 1 (self-leveling - horizontal joints).	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.3.7.3	MANDATORY Caulking work must be guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and/or staining adjacent surfaces for a period of three (3) years from the date of Certificate of Substantial Performance.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.2.3.8	<p>Cabinet Construction: MANDATORY Chamber must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by providing details of the design for horticultural, agricultural, and entomological research:</p>	
2.2.3.9	<p>Threshold: MANDATORY Chamber must be constructed with a threshold below the door(s) to prevent waste water and soil from escaping beneath the door.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>Cabinet exterior material:</p> <p>Cabinet interior material:</p> <p>Insulation:</p> <p>Cabinet exterior finishes:</p> <p>Cabinet interior finishes:</p> <p>Points will be awarded based on the information provided with regards to the types of materials used in the chamber construction.</p> <p>Bidder is requested to substantiate its compliance by the plan for containment and ease of access.</p>	
2.2.3.10	<p>Doors and Window: MANDATORY Doors must provide easy and secure access to</p>	Comply YES/NO	Up to 20 points	<p>Points will be awarded for ease of access and egress with roller carts.</p> <p>Bidder is requested to substantiate its compliance by providing a description of the</p>	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	chambers. Observation windows are desirable. POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 30 points	access to the chambers. Points will be awarded for: a) Number and size of doors (up to 5 points) b) Type of closures (up to 5 points) c) Ability to lock (up to 5 points) d) Observation windows (where applicable: double pane, light tight covers, etc.) (up to 15 points)	
2.2.3.11	Control Panel: MANDATORY Must be located on left hand or right hand side of door on front of chamber.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the control panel position.	
2.2.3.12	Wall Sanitation: MANDATORY Wall panels must be easy to sanitize between chamber uses.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of sanitation procedures.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 40 points	Points will be assessed on the basis of aspects such as removable panels, ease of removability, whether have to empty entire chamber etc.	
2.2.3.13	Additional Equipment Provisions:				
2.2.3.13.1	MANDATORY Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs (see 1.4.2 above) d) Compressed air spigot	Comply YES/NO		These features are mandatory.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 40 points	The Bidder will receive points based on its description of what is provided with the growth chamber. (How many ports, receptacles, hose bibs, spigots and the size, placement etc. 10 points for each type a-d)	
2.2.3.13.2	POINT RATED Chambers should be equipped with following additional equipment: a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)		Up to 20 points	These features are considered as desirable. The Bidder will receive points based on its description of what is provided with the growth chamber. a) 15 points, b) 5 points	
2.2.3.14	Collection Trays: MANDATORY Collection trays must be mounted beneath plant shelving to collect waste soil and water. All trays must be removable and autoclavable.	Comply YES/NO		Bidder is requested to substantiate its compliance by submitting drawings of the tray system for assessment by the evaluation team. Bidder is requested to provide complete drawings for the collection tray system along with a description of how the system will work, and with dimensions, weight etc.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 60 points	Points will be assessed for material suitability, diverting system to ensure all waste is directed into the catch trays, weight, mobility, ability to fit into an autoclave.	
2.2.3.15	Shelving units: MANDATORY Shelving units must be constructed from corrosion resistant metal. Shelves should have metal mesh work surface for stable support of small plant pots	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the provided shelves:	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	The individual shelves must be easily adjustable in height and be removable. POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 20 points	Points will be awarded on the basis of adjustability increment and range, ease of adjustment, work surface structure, dimensions of work surface, and removability.	
2.2.4	For Growth Chamber Type 4:				
2.2.4.1	Recommended Approximate External Dimensions: 350 W x 320 D x 280 H (cm) nominal, excluding vestibule. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO			
			Up to 50 points	Dimensions Bid: W ____ cm D ____ cm H ____ cm Points will be allocated on the basis of how close the bid dimensions are to the recommended dimensions.	
2.2.4.2	MANDATORY Chamber must have a central aisle with growth area on both sides of aisle.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the chamber.	
2.2.4.3	Convertibility of Tiers: MANDATORY: Must be able to be easily converted by the user from single tier lit shelving units to at least three tier lit shelving units.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the conversion from single to multiple lit shelving units:	
	POINT RATED The Bidder may receive points for additional value added		Up to 10 points	Points will be awarded on the basis of the ease of convertibility.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.2.4.4	features, goods or services. MANDATORY: Minimum Interior capacity: 18m³ POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO	Up to 10 points	Minimum Interior Volume of growth chamber bid: _____ m ³ Points will be awarded for chambers exceeding the minimum volume.	
2.2.4.5	MANDATORY: Minimum Lighted Growth Area: Single Tier chamber = 4.3m ² Two tier chamber = 8.6m ² Three tier chamber = 12.5m ² POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO	Up to 30 points	Bidder's Lighted Growth Area: Single tier configuration = _____ m ² Two tier configuration = _____ m ² Three tier configuration = _____ m ² Points will be awarded for chambers exceeding the minimum.	
2.2.4.6	MANDATORY: Minimum Growth Height (not including collection trays): Single tier chamber = 1500mm Two tier chamber = 750mm Three tier chamber = 500mm POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO	Up to 30 points	Bidder's Growth Height Capacity: Single tier configuration = _____ mm	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
				Two tier configuration = ____mm Three tier configuration = ____mm Points will be awarded for chambers exceeding the minimum.	
2.2.4.7	MANDATORY Chambers must be seismically secured to the floor slab. All edges of the chambers must be sealed tight against the floor slab to provide water containment.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.4.7.1	MANDATORY Sealants must be compatible with the wall panel material and must be multi-component chemical cure sealants (for total submersion sealing for possibility of standing water), must conform to CAN/CGSB-2-19.24-M90 (TT-00227E-Type 11, Class A) standard sealing compounds and as otherwise specified to exceed that standard;	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.4.7.2	MANDATORY Sealants must bear, in addition to the product identification name, the qualification number when tested under CAN/CGSB standard, Type 1 (self-leveling - horizontal joints).	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.4.7.3	MANDATORY Caulking work must be guaranteed against leakage, cracking, crumbling, melting,	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	shrinkage, running, loss of adhesion and/or staining adjacent surfaces for a period of three (3) years from the date of Certificate of Substantial Performance.			provided.	
2.2.4.8	Cabinet Construction: MANDATORY Must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the design for horticultural, agricultural, and entomological research:	
			Up to 50 points	Cabinet exterior material: Cabinet interior material: Insulation: Cabinet exterior finishes: Cabinet interior finishes: _____ Points will be awarded based on the information provided with regards to the types of materials used in the chamber construction.	
2.2.4.9	Threshold: MANDATORY Chamber must be constructed with a threshold below the door(s) to prevent waste water and soil from escaping beneath the door.	Comply YES/NO		Bidder is requested to substantiate its compliance by the plan for containment and ease of access.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 20 points	Points will be awarded for ease of access and egress with roller carts.	
2.2.4.10	Doors and Window: MANDATORY Doors must provide easy and secure access to chambers. Observation windows are desirable.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing a description of the access to the chambers.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 30 points	Points will be awarded for: d) Number and size of doors(up to 5 points) e) Type of closures (up to 5 points) f) Ability to lock (up to 5 points) d) Observation windows (where applicable: double pane, light tight covers, etc.) (up to 15 points)	
2.2.4.11	Control Panel: MANDATORY Must be located on left hand or right hand side of door on front of chamber.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the control panel position.	
2.2.4.12	Wall Sanitation: MANDATORY Wall panels must be easy to sanitize between chamber uses.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of sanitation procedures.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 40 points	Points will be assessed on the basis of aspects such as removable panels, ease of removability, whether have to empty entire chamber etc.	
2.2.4.13	Additional Equipment Provisions:				
2.2.4.13.1	MANDATORY Chambers must be equipped with following additional	Comply YES/NO		These features are mandatory.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	equipment: a) Instrument ports b) GFI power receptacles c) hose bibs (see 1.4.2 above) d) Compressed air spigot				
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 40 points	The Bidder will receive points based on its description of what is provided with the growth chamber. (How many ports, receptacles, hose bibs, spigots and the size, placement etc. 10 points for each type a-d)	
2.2.4.13.2	POINT RATED Chambers should be equipped with following additional equipment: a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)		Up to 20 points	These features are considered as desirable. The Bidder will receive points based on its description of what is provided with the growth chamber. a) 15 points, b) 5 points	
2.2.4.14	Collection Trays: MANDATORY Collection trays must be mounted beneath plant shelving to collect waste soil and water. All trays must be removable and autoclavable.	Comply YES/NO		Bidder is requested to substantiate its compliance by submitting drawings of the tray system for assessment by the evaluation team. Bidder is requested to provide complete drawings for the collection tray system along with a description of how the system will work, and with dimensions, weight etc.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 60 points	Points will be assessed for material suitability, diverting system to ensure all waste is directed into the catch trays, weight, mobility, ability to fit into	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.2.4.15	Anteroom: MANDATORY The anteroom must have a 1220 mm (4') deep outer vestibule with additional door for plant pest containment of pests with a higher risk of escape.	Comply YES/NO		an autoclave.	
2.2.4.16	Shelving units: MANDATORY Shelving units must be constructed from corrosion resistant metal. Shelves should have metal mesh work surface for stable support of small plant pots The individual shelves must be easily adjustable in height and be removable. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the provided shelves:	
			Up to 20 points	Points will be awarded on the basis of adjustability increment and range, ease of adjustment, work surface structure, dimensions of work surface, and removability.	
2.2.5	For Growth Chamber Type 5:				
2.2.5.1	Recommended Approximate External Dimensions: 295W x 295 D x 280H (cm) nominal. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO			
			Up to 50 points	Dimensions Bid: W ____ cm D ____ cm H ____ cm Points will be allocated on the basis of how close the bid dimensions are to the recommended dimensions.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.2.5.2	MANDATORY Central aisle with growth area on both sides of aisle.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the chamber.	
2.2.5.3	Convertibility of Tiers: MANDATORY: Must be able to be easily converted by the user from single tier lit shelving units to at least three tier lit shelving units. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO			
			Up to 10 points	Bidder is requested to substantiate its compliance by providing details of the conversion from single to multiple lit shelving units. Points will be awarded on the basis of the ease of convertibility.	
2.2.5.4	MANDATORY Minimum Interior Volume: 14m ³ POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO			
			Up to 10 points	Minimum Interior Volume of growth chamber bid: _____ m ³ Points will be awarded for chambers exceeding the minimum volume.	
2.2.5.5	MANDATORY Minimum Lighted Growth Area: Single Tier chamber = 3.6m ² Two tier chamber = 7.2m ² Three tier chamber = 10.8m ² POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO			
			Up to 30 points	Bidder's Lighted Growth Area: _____ m ² Single tier configuration = _____ m ²	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
				Two tier configuration = _____m ² Three tier configuration = _____m ² Points will be awarded for chambers exceeding the minimum.	
2.2.5.6	MANDATORY Minimum Growth Height (not including collection trays): Single tier chamber = 1500mm Two tier chamber = 750mm Three tier chamber = 500mm	Comply YES/NO			
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 30 points	Bidder's Growth Height Capacity: Single tier configuration = _____mm Two tier configuration = _____mm Three tier configuration = _____mm Points will be awarded for chambers exceeding the minimum.	
2.2.5.7	MANDATORY Chambers must be seismically secured to the floor slab. All edges of the chambers must be sealed tight against the floor slab to provide water containment.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.5.7.1	MANDATORY Sealants must be compatible with the wall panel material and must be multi-component chemical cure sealants	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	(for total submersion sealing for possibility of standing water), must conform to CAN/CGSB-2-19.24-M90 (TT-00227E-Type 11, Class A) standard sealing compounds and as otherwise specified to exceed that standard;				
2.2.5.7.2	MANDATORY Sealants must bear, in addition to the product identification name, the qualification number when tested under CAN/CGSB standard, Type 1 (self-leveling - horizontal joints).	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.5.7.3	MANDATORY Caulking work must be guaranteed against leakage, cracking, crumbling, melting, shrinkage, running, loss of adhesion and/or staining adjacent surfaces for a period of three (3) years from the date of Certificate of Substantial Performance.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.5.8	Cabinet Construction: Must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the design for horticultural, agricultural, and entomological research.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 50 points	Cabinet exterior material: Cabinet interior material:	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
				<p>Insulation:</p> <p>Cabinet exterior finishes:</p> <p>Cabinet interior finishes:</p> <p>Points will be awarded based on the information provided with regards to the types of materials used in the chamber construction</p> <p>Bidder is requested to substantiate its compliance by the plan for containment and ease of access.</p>	
2.2.5.9	<p>Threshold:</p> <p>MANDATORY Chamber must be constructed with a threshold below the door(s) to prevent waste water and soil from escaping beneath the door.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>Points will be awarded for ease of access and egress with roller carts.</p> <p>Bidder is requested to substantiate its compliance by providing a description of the access to the chambers.</p>	
2.2.5.10	<p>Doors and Window:</p> <p>MANDATORY Doors must provide easy and secure access to chambers. Observation windows are desirable.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO	Up to 20 points	<p>Points will be awarded for:</p> <p>g) Number and size of doors (up to 5 points)</p> <p>h) Type of closures (up to 5 points)</p> <p>i) Ability to lock (up to 5 points)</p> <p>d) Observation windows (where applicable: double pane, light tight covers, etc.) (up to 15 points)</p> <p>Bidder is requested to substantiate its compliance by</p>	
2.2.5.11	<p>Control Panel:</p> <p>MANDATORY Must be located on left</p>	Comply YES/NO			

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	hand or right hand side of door on front of chamber.			describing the control panel position.	
2.2.5.12	Wall Sanitation: MANDATORY Wall panels must be easy to sanitize between chamber uses.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of sanitation procedures.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 40 points	Points will be assessed on the basis of aspects such as removable panels, ease of removability, whether have to empty entire chamber etc.	
2.2.5.13	Additional Equipment Provisions:				
2.2.5.13.1	Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs (See 1.4.2 above) d) Compressed air spigot	Comply YES/NO		These features are mandatory.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 40 points	The Bidder will receive points based on its description of what is provided with the growth chamber. (How many ports, receptacles, hose bibs, spigots and the size, placement etc. 10 points for each type a-d)	
2.2.5.13.2	POINT RATED Chambers should be equipped with following additional equipment: a) Ethernet ports (see A2 1.8.3) b) Other Provisions (or Functionality)		Up to 20 points	These features are considered as desirable. The bidder will receive points based on its description of what is provided with the growth chamber. a) 15 points, b) 5 points	
2.2.5.14	Collection Trays:	Comply		Bidder is requested to	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	MANDATORY Collection trays must be mounted beneath plant shelving to collect waste soil and water. All trays must be removable and autoclavable.	YES/NO		substantiate its compliance by submitting drawings of the tray system for assessment by the evaluation team. Bidder is requested to provide complete drawings for the collection tray system along with a description of how the system will work, and with dimensions, weight etc.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 60 points	Points will be assessed for material suitability, diverting system to ensure all waste is directed into the catch trays, weight, mobility, ability to fit into an autoclave.	
2.2.5.15	Shelving units: MANDATORY Shelving units must be constructed from corrosion resistant metal. Shelves should have metal mesh work surface for stable support of small plant pots The individual shelves must be easily adjustable in height and be removable. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the provided shelves:	
			Up to 20 points	Points will be awarded on the basis of adjustability increment and range, ease of adjustment, work surface structure, dimensions of work surface, and removability.	
2.2.6	For Growth Chamber Type 6:				
2.2.6.1	Recommended Approximate External Dimensions:	Comply YES/NO			

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	295W x 295D x 260H (cm) nominal. POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 50 points	Dimensions Bid: W ____ cm D ____ cm H ____ cm Points will be allocated on the basis of how close the bid dimensions are to the recommended dimensions.	
2.2.6.2	MANDATORY Chamber must have a central aisle with plant growth area on both sides of aisle.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the chamber.	
2.2.6.3	MANDATORY Minimum Interior Volume: 14m ³ POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO	Up to 10 points	Minimum Interior Volume of growth chamber bid: ____ m ³ Points will be awarded for chambers exceeding the minimum volume.	
2.2.6.4	MANDATORY Minimum Lighted Growth Area: 4.25m ² POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO	Up to 10 points	Bidder's Lighted Growth Area: Single tier configuration = ____ m ² Points will be awarded for chambers exceeding the minimum.	
2.2.6.5	MANDATORY Minimum Growth Height: 2000mm	Comply YES/NO			

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 30 points	Bidder's Growth Height Capacity: Single tier configuration = _____mm Points will be awarded for chambers exceeding the minimum.	
2.2.6.6	MANDATORY Chambers must be seismically secured to the floor slab. All edges of the chambers must be sealed tight against the floor slab to provide water containment.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.6.6.1	MANDATORY Sealants must be compatible with the wall panel material and must be multi-component chemical cure sealants (for total submersion sealing for possibility of standing water), must conform to CAN/CGSB-2-19.24-M90 (TT-00227E-Type 11, Class A) standard sealing compounds and as otherwise specified to exceed that standard;	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.6.6.2	MANDATORY Sealants must bear, in addition to the product identification name, the qualification number when tested under CAN/CGSB standard, Type 1 (self-leveling - horizontal joints).	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber provided.	
2.2.6.6.3	MANDATORY Caulking work must be guaranteed against leakage,	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details for chamber	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	cracking, crumbling, melting, shrinkage, running, loss of adhesion and/or staining adjacent surfaces for a period of three (3) years from the date of Certificate of Substantial Performance.			provided.	
2.2.6.7	Cabinet Construction: MANDATORY Must be designed specifically for horticultural, agricultural, and entomological research with all materials suitably designed for the climate conditions of these applications POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of the design for horticultural, agricultural, and entomological research.	
			Up to 50 points	Cabinet exterior material: Cabinet interior material: Insulation: Cabinet exterior finishes: Cabinet interior finishes: _____, Points will be awarded based on the information provided with regards to the types of materials used in the chamber construction.	
2.2.6.8	Threshold: MANDATORY Chamber must be constructed with a threshold below the door(s) to prevent waste water and soil from escaping beneath the	Comply YES/NO		Bidder is requested to substantiate its compliance by the plan for containment and ease of access.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	door. POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 20 points	Points will be awarded for ease of access and egress with roller carts.	
2.2.6.9	Doors and Window: MANDATORY Doors must provide easy and secure access to chambers. Observation windows are desirable. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing a description of the access to the chambers. a) Points will be awarded for: a) Number and size of doors (up to 5 points) b) Type of closures (up to 5 points) c) Ability to lock (up to 5 points) d) Observation windows (where applicable: double pane, light tight covers, etc.) (up to 15 points)	
2.2.6.10	Control Panel: MANDATORY Must be located on left hand or right hand side of door on front of chamber.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the control panel position.	
2.2.6.11	Additional Equipment Provisions:				
2.2.6.11.1	Chambers must be equipped with following additional equipment: a) Instrument ports b) GFI power receptacles c) hose bibs (See 1.4.2 above) d) Compressed air spigot POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		These features are mandatory. The Bidder will receive points based on its description of what is provided with the growth chamber. (How many ports,	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.2.6.11.2	<p>POINT RATED Chambers should be equipped with following additional equipment:</p> <p>a) Ethernet ports (see A2 1.8.3)</p> <p>b) Other Provisions (or Functionality)</p>		Up to 20 points	<p>receptacles, hose bibs, spigots and the size, placement etc. 10 points for each type a-d)</p> <p>These features are considered as desirable. The bidder will receive points based on its description of what is provided with the growth chamber. a) 15 points, b) 5 points</p>	
2.2.6.12	<p>Collection Trays:</p> <p>MANDATORY Collection trays must be mounted beneath plant shelving to collect waste soil and water. All trays must be removable and autoclavable.</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by submitting drawings of the tray system for assessment by the evaluation team.</p> <p>Provide complete drawings for the collection tray system along with a description of how the system will work, and with dimensions, weight etc.</p>	
2.2.6.13	<p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>		Up to 60 points	<p>Points will be assessed for material suitability, diverting system to ensure all waste is directed into the catch trays, weight, mobility, ability to fit into an autoclave.</p>	
	<p>Benching:</p> <p>MANDATORY Must provide two (2) free-standing, adjustable corrosion resistant metal benches.</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by providing details of the provided benches:</p>	
	<p>POINT RATED These benches should be adjustable in height and have metal meshwork surfaces, and should cover the entire growth</p>		Up to 40 points	<p>Points will be awarded on the basis of adjustability increment and range, ease of adjustment, work surface structure, dimensions of work surface, and</p>	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	area. Benches should be easily removable from the chamber.			removability.	
2.2.6.14	Wall Sanitation: MANDATORY Wall panels must be easy to sanitize between chamber uses.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details of sanitation procedures.	
2.3	LIGHTING				
2.3.1	For Growth Chamber Types 1 & 2:				
2.3.1.1	Minimum Light Intensity and Uniformity: MANDATORY Light intensity must be adjustable at a minimum from 0 to 1000 umole/m ² /s in single tier configuration. Light intensity must be adjustable at a minimum from 0 to 450 umole/m ² /s in two or three tier configuration, measured at a 150mm (6 inches) distance from light source. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about light intensity and uniformity:	
			Up to 30 Points	Light intensity is adjustable from 0 to _____ umole/m ² /s in single tier configuration, measured at a 150mm (6 inches) distance from light source. <i>Up to 5 points for greater than mandatory minimum intensity.</i> Light intensities adjustable from 0 to _____ umole/m ² /s in two or three tier configuration, measured	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
				at a 150mm (6 inches) distance from light source. <i>Up to 5 points for greater than mandatory minimum intensity.</i> Points will be awarded based on the description of how the lighting system works with regards to the uniformity of lighting levels in multitier configuration (up to 20 points)	
2.3.1.2	Canopy: MANDATORY: Lamp canopies must be easily height adjustable. Top canopy must be counterbalanced for ease of vertical movement. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about the lamp canopies included with the chamber.	
			Up to 20 Points	Points will be awarded based on the above description with regards to the a) Ease of canopy adjustment (up to 10 points); b) Range of canopy adjustment (up to 5 points) c) Size of increments of canopy adjustment (up to 5 points).	
2.3.1.3	Light Control: MANDATORY: Lights must have a minimum 3 levels of control.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about the number of levels of control for its lights.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 20 Points	Points will be awarded based on the description above based on the level of light control from the minimum 3 levels to continuously adjustable.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.3.1.4	<p>Lamps: MANDATORY: Light must be compatible with horticultural and agricultural and entomological research. Replacement lights must be readily commercially available.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about its lamps.	
2.3.1.5	<p>Ballasts: MANDATORY: Ballasts must be high efficiency electronic (where applicable).</p> <p>Light Meter: MANDATORY: A quantum light meter with alarm capability must be included with chamber for displaying and recording of light output.</p>	Comply YES/NO/ NA	Up to 40 Points	Points will be awarded based on the above description with regards to the following: a) Type of bulbs (T8, T5, incandescent, LED, or mixture) (up to 20 points) b) Readily commercially available bulbs (up to 10 points); c) Provide light spectrum to evaluate suitability to Horticulture /Agriculture/ Entomology (up to 10 points)	
2.3.1.6		Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about its quantum light meter.	
2.3.2	For Growth Chamber Types 3, 4, &5:				
2.3.2.1	Minimum Light Intensity and Uniformity:	Comply YES/NO		Bidder is requested to substantiate its compliance by	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	<p>MANDATORY Light intensity must be adjustable at a minimum from 0 to 1000 umole/m²/s in single tier configuration.</p> <p>Light intensity must be adjustable at a minimum from 0 to 450 umole/m²/s in two or three tier configuration, measured at a 150mm (6 inches) distance from light source.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>			<p>providing details about light intensity and uniformity:</p> <p>Light intensity is adjustable from 0 to _____ umole/m²/s in single tier configuration, measured at a 150mm (6 inches) distance from light source.</p> <p>Up to 5 points for greater than mandatory minimum intensity.</p> <p>Light intensities adjustable from 0 to _____ umole/m²/s in two or three tier configuration, measured at a 150mm (6 inches) distance from light source.</p> <p>Up to 5 points for greater than mandatory minimum intensity.</p> <p>Points will be awarded based on the description of how the lighting system works with regards to the uniformity of lighting levels in multitier configuration (up to 20 points)</p>	
2.3.2.2	<p>Top Canopy Adjustability:</p> <p>MANDATORY: Top light canopies must be easily height adjustable and</p>	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about the lamp	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.3.2.3	must be counterbalanced allowing manual adjustable vertical movement.			canopies included with the chamber.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 20 Points	Points will be awarded based on the above description with regards to the a) Ease of canopy adjustment (up to 10 points); b) Range of canopy adjustment (up to 5 points) c) Size of increments of canopy adjustment (up to 5 points).	
	Second and Third Light Canopies: MANDATORY: Second and third light canopies must be cantilevered from the side of the growth unit, and must be easily removable and adjustable in height	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about the 2 nd & 3 rd lamp canopies supplied:	
2.3.2.4	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 50 Points	Points will be awarded based on the above description with regards to the following a) Details of canopy cantileverage (up to 20 points) b) Range increments of height adjustment (up to 10 points) c) Removability of the light canopy (up to 20 points).	
	Light Control: MANDATORY: Lights must have a minimum 3 levels of control.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about the number of levels of control for its lights.	
	POINT RATED The Bidder may receive points for additional value added		Up to 20 Points	Points will be awarded based on the description above based on	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	features, goods or services.			the level of light control from the minimum 3 levels to continuously adjustable.	
2.3.2.5	Lamps: MANDATORY: Light must be compatible with horticultural and agricultural and entomological research. Replacement lights must be readily commercially available. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about its lamps.	
2.3.2.6	Ballasts: MANDATORY: Ballasts must be high efficiency electronic (where applicable).	Comply YES/NO/NA	Up to 40 Points	Points will be awarded based on the above description with regards to the following: a) Type of bulbs (T8, T5, incandescent, LED, or mixture) (up to 20 points) b) Readily commercially available bulbs (up to 10 points); c) Provide light spectrum to evaluate suitability to Horticulture /Agriculture/ Entomology (up to 10 points)	
2.3.2.7	Light Meter: MANDATORY: A quantum light meter with alarm capability must be included with chamber for displaying and recording of light output.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about its quantum light meter.	
2.3.3	For Growth Chamber Types 6:				

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.3.3.1	<p>Minimum Light Intensity and Uniformity: MANDATORY: Light intensity must be adjustable at a minimum from 0 to 800 umole/m2/s in single tier configuration, measured at a 150mm (6 inches) distance from light source.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by providing details about light intensity and uniformity:</p> <p>Light intensity is adjustable from 0 to _____ umole/m²/s in single tier configuration, , measured at a 150mm (6 inches) distance from light source. Up to 10 point for greater than mandatory minimum intensity.</p>	
2.3.3.2	<p>Canopy: MANDATORY: Canopies must be easily height adjustable and must be counterbalanced, allowing manual adjustable vertical movement.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by providing details about the lamp canopies included with the chamber.</p> <p>Points will be awarded based on the above description with regards to the a) Ease of canopy adjustment (up to 10 points); b) Range of canopy adjustment (up to 5 points) c) Size of increments of canopy adjustment (up to 5 points).</p>	
2.3.3.3	<p>Light Control: MANDATORY: Lights must have a minimum 3 levels of control.</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by providing details about the</p>	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
				number of levels of control for its lights.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 20 Points	Points will be awarded based on the description above based on the level of light control from the minimum 3 levels to continuously adjustable.	
2.3.3.4	Lamps: MANDATORY: Light must be compatible with horticultural and agricultural and entomological research. Replacement lights must be readily commercially available. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about its lamps.	
			Up to 40 Points	Points will be awarded based on the above description with regards to the following: a) Type of bulbs (T8, T5, incandescent, LED, or mixture) (up to 20 points) b) Readily commercially available bulbs (up to 10 points); c) Provide light spectrum to evaluate suitability to Horticulture /Agriculture/ Entomology (up to 10 points)	
2.3.3.5	Ballasts: MANDATORY: Ballasts must be high efficiency electronic (where applicable).	Comply YES/NO/ NA			
2.3.3.6	Light Meter: MANDATORY: A quantum light meter with alarm capability must be included with chamber for displaying and recording of light	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about its quantum light meter.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	output.				
2.4	TEMPERATURE CONTROL				
2.4.1	<p>Control: MANDATORY: Chamber temperature control must be uniform and consistent to be compatible with horticultural and agricultural and/or entomological research. Minimum of $\pm 1^{\circ}\text{C}$, at control point.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO	Up to 20 Points	<p>Bidder is requested to substantiate its compliance by providing details about the chamber's temperature control system.</p> <p>Points will be assessed for: a) the increments of temperature adjustment (10°), and b) temperature uniformity and stability: $\pm \text{ }^{\circ}$ (10°)</p>	
2.4.2	Temperature Safety Limits:				
2.4.2.1	<p>MANDATORY: Primary: The chamber must have a programmable high and low temperature limit tracking alarm that automatically follows the programmed set point.</p>	Comply YES/NO			
2.4.2.2	<p>MANDATORY: Secondary: The chamber must have an independent, high and low temperature alarm for increased security.</p>	Comply YES/NO			
2.4.3	<p>Sensors: MANDATORY: Sensors must be compatible with horticultural and agricultural and entomological research. Sensors must be located in a self-contained, portable</p>	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about the chamber's sensors including their type and location	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	aspirator. POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 5 Points	Points will be awarded based on the above description with regards to the details of how the sensor functions.	
2.4.4	Temperature Control Range:				
2.4.4.1	MANDATORY: Minimum Range for Growth Chamber Type 1 must be: +4°C to + 40°C lights OFF, +10°C to +40°C lights ON.	Comply YES/NO		Ranges LIGHTS OFF: + ____°C to + ____°C Ranges LIGHTS ON: + ____°C to + ____°C	
2.4.4.2	MANDATORY: Minimum Range for Growth Chamber Type 2 must be: -5°C to + 40°C lights OFF, +4°C to +40°C lights ON	Comply YES/NO		Bidder is requested to substantiate its compliance by providing details about the Type 2 Growth chamber's temperature ranges.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 40 Points	Points allocated where the named ranges are extended, Ranges LIGHTS OFF: + ____°C to + ____°C Ranges LIGHTS ON: + ____°C to + ____°C	
2.4.4.3	MANDATORY: Minimum Range for Growth Chamber Types 3 to 6 must be: +10°C to +35°C lights OFF, +15°C to + 35°C lights ON.	Comply YES/NO		Ranges LIGHTS OFF: + ____°C to + ____°C Ranges LIGHTS ON: + ____°C to + ____°C	
2.4.5	Low Temperature Stability: For Growth Chamber type 2: MANDATORY: Temperature must be maintained within 0.5°C of set point			Bidder is requested to substantiate its compliance by providing details about the chamber's temperature ranges, including details of maintaining	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	temperatures at all times.			low temperature to +/- 0.5°C in Type 2 chamber while going through defrost cycles, etc.	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 20 Points	Points will be awarded based on the above description with regards to the description of how this system will maintain its temperature (particularly with regards to the lower end)	
2.5	REFRIGERATION				
2.5.1	For Growth Chamber Types 1 & 2:				
2.5.1.1	Condensing Unit: MANDATORY: Cabinet must be supplied with a water-cooled condensing unit with hot gas bypass system for continuous compressor operation. Condensing unit must be located in the machine compartment and must include a 3-way water valve and hand operated shut off bypass valve. The condensing unit must operate with the cooling tower which is set to provide water at +24°C to +29°C.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing a complete description of the condensing unit provided with these two types of growth chambers	
2.5.1.2	Valve: MANDATORY: Chamber must have an electromagnetic 3-way proportional valve that smoothly modulates heating and cooling.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the valve provided with these two types of growth chambers.	
2.5.1.3	MANDATORY: Evaporator: The evaporator must have copper-tube construction.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the evaporator	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.5.1.4	Refrigerant: MANDATORY: Condensing unit must be charged with an environmentally friendly CFC-free refrigerant that is readily commercially available.	Comply YES/NO		provided with these two types of growth chambers. Bidder is requested to substantiate its compliance by describing the refrigerant provided with these two types of growth chambers.	
2.5.1.5	Monitoring: MANDATORY: High and low pressure transducers must be provided to monitor the condition of the refrigeration system. Control systems must be able to log, and alarm; should high/ low pressure values exceed user specified alarm value.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the monitoring provided with these two types of growth chambers.	
2.5.1.6	Chamber Type 2 Extended Temperature System : MANDATORY: Chamber type 2 must be designed with multiple coils or coil segments for extended use at +4 °C without affecting chamber temperature during defrost cycles of evaporators. The secondary evaporators should take over when the primary evaporator goes through its defrost cycle.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing how this chamber handles extended use at +4°C without affecting chamber temperature during defrost cycles of evaporators	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 50 points	Points will be awarded based on the above description with regards to the description of how this system will maintain its temperature (particularly with	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
2.5.2	For Growth Chamber Types 3, 4, 5 & 6:			regards to the lower end)	
2.5.2.1	MANDATORY: Condensing Unit: The cabinet must be supplied a water-cooled, hermetically sealed condensing unit with hot gas bypass system for continuous compressor operation, extended compressor life and close temperature control. The condensing unit must operate with a cooling tower which is set to provide water at +24°C to +29°C.	Comply YES/NO		Bidder is requested to substantiate its compliance by providing a complete description of the condensing unit provided with these types of growth chambers	
2.5.2.2	MANDATORY: Valves: Chamber must have an electromagnetic 3-way proportional valve that smoothly modulates heating and cooling.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the valve provided with these types of growth chambers.	
2.5.2.3	MANDATORY: Evaporator: The evaporator must have copper-tube construction.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the evaporator provided with these types of growth chambers.	
2.5.2.4	MANDATORY: Refrigerant: The condensing unit must be charged with an environmentally friendly CFC-free refrigerant that is readily commercially available.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the refrigerant provided with these types of growth chambers.	
2.5.2.5	MANDATORY: Monitoring: High and low pressure transducers must be provided to monitor the condition of the refrigeration system. Control	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the monitoring provided with these types of growth chambers.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	systems must be able to log, and alarm should high/ low pressure values exceed user specified alarm value.				
2.6	AIR FLOW				
2.6.1	For Growth Chamber Types 1 & 2:				
2.6.1.1	Direction and Uniformity: MANDATORY: Airflow should be vertical in single tier configuration and must be horizontal in multi-tier configuration. For all configurations, airflow must be uniform over the growth area(s) POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO	Up to 40 points	Bidder is requested to substantiate its compliance by describing the airflow provided with these types of growth chambers. Points will be awarded for various airflows: a) Single tier direction (up to 10 points) b) Multi-tier direction (up to 10 points) c) Single tier uniformity (single outlet- multi outlet laminar) (up to 10 points), d) Multitier direction uniformity (single outlet- multi outlet laminar) (up to 10 points)	
2.6.1.2	Components: MANDATORY: The Contractor must ensure that the conditioning unit contains all fans, heaters and valves necessary to meet the specified parameters.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the components provided with these types of growth chambers.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	<p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p> <p>Fresh Air: MANDATORY: The chamber must have individual adjustment of positively sealed inlet and outlet from open approximately 0.57m³/min (20ft³/min) to closed.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>		Up to 10 points	The components and details of airflow will be assessed for points.	
2.6.1.3		Comply YES/NO		Airflow provided: _____	
			Up to 10 points	Points awarded for exceeding requirement.	
2.6.1.4	<p>Filters: MANDATORY: Must have HEPA filter compatibility on fresh air intake and exhaust, removable and exchangeable with standard air filters.</p> <p>POINT RATED The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the filters provided with these types of growth chambers.	
			Up to 20 points	Points will be awarded on the ease of exchangeability with standard filters, and standard and HEPA filter availability and sizes (Common sizes)	
2.6.1.5	<p>Exhaust Collar: MANDATORY Must include an exhaust collar to connect to building central exhaust system.</p>	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the exhaust collar provided with these types of growth chambers.	
2.6.2	For Growth Chamber Types 3, 4 & 5:				
2.6.2.1	<p>Direction and Uniformity: MANDATORY: For single tier configuration, airflow can be</p>	Comply YES/NO		Compliance by describing the airflow provided with these types of growth chambers.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	vertical or, preferably, horizontal. Airflow must be horizontal for multi-tier configuration. For all configurations, airflow must be uniform over the growth area(s)				
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 70 points	Points will be awarded for various airflows: a) Single tier direction (up to 40 points) b) Multi-tier direction (up to 10 points) c) Single tier uniformity (single outlet- multi outlet laminar) (up to 10 points), d) Multitier direction uniformity (single outlet- multi outlet laminar) (up to 10 points)	
2.6.2.2	Components: MANDATORY: The Contractor must ensure that the conditioning unit contains all fans, heaters and valves necessary to meet the specified parameters. POINT RATED: The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the components provided with these types of growth chambers.	
			Up to 10 points	The components and details of airflow will be assessed for points.	
2.6.2.3	Fresh Air: MANDATORY: Chamber must have minimum airflow of 40 cfm POINT RATED: The Bidder may receive	Comply YES/NO		Airflow provided: _____	
			Up to 10 points	Points awarded for exceeding	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	points for additional value added features, goods or services.		points	requirement.	
2.6.2.4	<p>Filters:</p> <p>MANDATORY: Filters must have HEPA filter compatibility on fresh air intake and exhaust, removable and exchangeable with standard air filters.</p> <p>POINT RATED: The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the filters provided with these types of growth chambers.	
2.6.2.5	<p>Occupancy Switch:</p> <p>POINT RATED: Should have switch mounted on exterior of chamber that temporarily slows fans to reduce ambient noise.</p>		Up to 20 points	Points will be awarded on the ease of exchangeability with standard filters, and standard and HEPA filter availability and sizes (Common sizes)	
2.6.2.6	<p>Exhaust Collar:</p> <p>MANDATORY Must include exhaust collar to connect to building central exhaust system.</p>	Comply YES/NO		Bidder is requested to substantiate its compliance by describing whether the chambers have a switch mounted on the exterior of chamber that temporarily slows fans to reduce ambient noise and by providing brief details on how it works	
2.6.3	For Growth Chamber Type 6:				
2.6.3.1	<p>Direction and uniformity:</p> <p>MANDATORY: Air flow must be vertical and uniform over the growth area(s).</p>	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the exhaust collar provided with these types of growth chambers.	
	POINT RATED: The Bidder may receive		Up to 20	Points will be awarded for	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	points for additional value added features, goods or services.		points	a) Airflow direction (up to 10 points) b) Airflow uniformity (single outlet- multi outlet laminar) (up to 10 points)	
2.6.3.2	Components: MANDATORY: The Contractor must ensure that the conditioning unit contains all fans, heaters and valves necessary to meet the specified parameters. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the components provided with these types of growth chambers.	
			Up to 10 points	The components and details of airflow will be assessed for points.	
2.6.3.3	Fresh Air: MANDATORY: Chamber must have minimum airflow of 80 POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Airflow provided: _____	
			Up to 10 points	Points awarded for exceeding requirement.	
2.6.3.4	Filters: MANDATORY: Filters must have HEPA filter compatibility on fresh air intake and exhaust, removable and exchangeable with standard air filters. POINT RATED The Bidder may receive points for additional value added features, goods or services.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the filters provided with these types of growth chambers.	
			Up to 20 points	Points will be awarded on the ease of exchangeability with standard filters, and standard and HEPA filter availability and sizes (Common sizes)	
2.6.3.5	Occupancy Switch:		Up to 20	Bidder is requested to	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	POINT RATED: Should have switch mounted on exterior of chamber that temporarily slows fans to reduce ambient noise.		points	substantiate its compliance by describing whether the chambers have a switch mounted on the exterior of chamber that temporarily slows fans to reduce ambient noise and by providing brief details on how it works.	
2.6.3.6	Exhaust Collar: Must include exhaust collar to connect to building central exhaust system.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the exhaust collar provided with these types of growth chambers.	
2.7	HUMIDITY CONTROL				
2.7.1	For Growth Chamber Types 1 & 2:				
2.7.1.1	Humidity Control Range: MANDATORY: Must be up to 75% RH lights OFF, 70% RH lights ON, with a 25°C maximum dew point	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the ranges of humidity control provided with these types of growth chambers. ____ RH lights OFF ____ RH Lights ON (with a 25°C maximum dew point)	
	POINT RATED: The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	Points will be awarded for exceeding the desired minimal specifications	
2.7.1.2	Additive humidity: MANDATORY: Chambers must use additive humidification for controlling humidity levels (Ultrasonic preferred)	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the humidification type provided with these types of growth chambers. <i>Spray nozzle - Ultrasonic humidification</i>	
	POINT RATED: The Bidder may receive		Up to 60	Points will be awarded for based	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	points for additional value added features, goods or services.		points	on the description provided of the type of humidification provided as well as details on how it functions.	
2.7.1.3	<p>Control:</p> <p>MANDATORY: Control to $\pm 5\%$ RH must be provided. System must incorporate a dry humidity sensor to directly measure humidity in %RH.</p> <p>POINT RATED: The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by describing the level of control provided with these types of growth chambers.</p> <p>Control to \pm _____ % RH</p>	
2.7.1.4	<p>Dehumidification:</p> <p>MANDATORY: Range must be down to 50% RH, with a minimum 10°C dew point.</p> <p>POINT RATED: The Bidder may receive points for additional value added features, goods or services.</p>	Comply YES/NO	Up to 10 points	<p>Points will be awarded based on the description above of humidity control, as well as for tighter control</p> <p>Bidder is requested to substantiate its compliance by describing the dehumidification type provided with these types of growth chambers.</p> <p>RH Range _____ % (with a minimum 10°C dew point)</p> <p>Points will be awarded for exceeding described ranges.</p>	
2.7.2	For Growth Chamber Types 3, 4, 5, & 6:				
2.7.2.1	<p>Humidity Control Range:</p> <p>MANDATORY: Up to 55% RH lights OFF or On limited by a +25°C maximum dew point</p>	Comply YES/NO		<p>Bidder is requested to substantiate its compliance by describing the ranges of humidity control provided with these types of growth chambers.</p> <p>_____ RH lights OFF or ON (limited by a +25°C maximum dew point)</p>	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	Points will be awarded for exceeding described ranges.	
2.7.2.2	Additive humidity: MANDATORY: Chambers must use additive humidification for controlling humidity levels (Ultrasonic preferred)	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the humidification type provided with these types of growth chambers. <i>Spray nozzle- Ultrasonic humidification</i>	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 60 points	Points will be awarded based on the description provided of the type of humidification provided as well as details on how it functions.	
2.7.2.3	Control: MANDATORY: Control to $\pm 5\%$ RH must be provided. System must incorporate a dry humidity sensor to directly measure humidity in %RH.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the level of control provided with these types of growth chambers. Control to \pm ____ % RH	
	POINT RATED The Bidder may receive points for additional value added features, goods or services.		Up to 10 points	Points will be awarded based on the description above of humidity control, as well as for tighter control.	
2.7.2.4	Dehumidification: MANDATORY: Range must be down to 50% RH, with a minimum 10°C dew point.	Comply YES/NO		Bidder is requested to substantiate its compliance by describing the dehumidification type provided with these types of growth chambers. RH Range ____ % (with a minimum 10°C dew point)	
	POINT RATED The Bidder may receive points for additional value added		Up to 10 points	Points will be awarded for exceeding described ranges.	

Item	Description	MANDATORY Compliance	POINT RATED Available Points	Substantiation	Reference in Supporting Documentation
	features, goods or services.				

ANNEX A2 INSTALLATION REQUIREMENTS:

Item	Description	MANDATORY
3.0	The Bidder must be in accordance with all articles of ANNEX A2 INSTALLATION REQUIREMENTS	COMPLY YES / NO SIGNATURE OF BIDDER;

ANNEX A3 HEALTH AND SAFETY REQUIREMENTS

Item	Description	MANDATORY
4.0	The Bidder must be in accordance with all articles of ANNEX A3 HEALTH AND SAFETY REQUIREMENTS	COMPLY YES / NO SIGNATURE OF BIDDER;

Solicitation No. - N° de l'invitation
EZ899-160422/A
Client Ref. No. - N° de réf. du client
EZ899-160422

Amd. No. - N° de la modif.
File No. - N° du dossier
VAN-5-38086

Buyer ID - Id de l'acheteur
VAN584
CCC No./N° CCC - FMS No./N° VME

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VANCOUVER BC V6Z 0B9**

Solicitation No. : EZ899-160422/A

**Solicitation Closes at: 2:00 PM PDT
on: October 20, 2015**

**Réception des soumissions
Travaux publics et services gouvernementaux Canada
800 rue Burrard, 219 étage
Vancouver (C.-B) V6Z 0B9**

N° de l'invitation : EZ899-160422/A

**La réception des soumissions prend fin le: 20 Octobre, 2015
à: 14:00 PM PDT**
