



Request for Tenders

To: Agriculture and Agri-Food Canada (AAFC)

Project Title:

Installation of 4 cold rooms and 1 growth room

At: Southern Crop Protection and Food Research Centre in London, Ontario

Tenders **must** be received **by: 2:00 PM**, Eastern Standard Time

On: March 7th, 2014 at the following address:

Agriculture and Agri-Food Canada

Corporate Management Branch
Assets Team – Eastern Service Centre

TENDER RECEIVING UNIT

2001 University St., Suite 671-TEN
Montreal, QC
H3A 3N2

**Note: Tenders received at a location other than this one
will be rejected.**

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PLANS

ARCHITECTURAL:

- A000 COVER SHEET AND LIST OF DRAWINGS
- A001 KEY PLANS AND SYMBOLS LEGEND
- A200 ENLARGED FLOOR PLANS, ELEVATIONS AND DETAILS
- A201 ENLARGED FLOOR PLANS, ELEVATIONS AND DETAILS

MECHANICAL:

- M101 MECHANICAL LEGEND, DRAWING LIST, SCHEDULES AND DEMOLITION
- M201 PART FLOOR PLANS MECHANICAL
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ELECTRICAL:

- E101 ELECTRICAL LEGEND, ABBREVIATIONS, PLANS, DETAILS AND ELECTRICAL RISER



INSTRUCTIONS TO TENDERERS

- | | | |
|---------------------------------------|----|---|
| Invitation | 1. | Sealed tenders will be received up to the local time, on the date, and at the location indicated on the Tender Form, for the construction of the described works. |
| Information on Site Conditions | 2. | Each tenderer must fully inform themselves of the conditions relating to the work to be performed and shall inspect the site and be thoroughly familiar with the Plans Specifications and all terms and covenants of the tender documents. Failure to do so will not relieve the successful tenderer of their obligations to enter into the contract and to carry out the work for the consideration as set forth in their offer. |
| Pre-Tender Meeting | 3. | A pre-tender information meeting, followed by a site visit is scheduled <u>for 1:00 PM, February 25th, 2014 at the Southern Crop Protection and Food Research Centre located on 1391 Sandford Street, London, Ontario, N5V 4T3.</u> Tenderers are requested to be present at the reception desk at least 10 minutes prior to the meeting. No other pre-tender meeting will be scheduled during the tender process. Attendance by interested tenderers is not mandatory . |
| Explanations and Modifications | 4. | Any explanation desired by tenderers regarding the meaning or interpretation of the tender documents must be requested <u>in writing</u> and with sufficient time allowed for a reply to reach them before the submission of their tenders. Verbal explanations or instructions given before the award of the contract will not be binding. Any request for explanation must be directed ONLY to the Contracting Authority named below: |

Carol Rahal
Agriculture and Agri-Food Canada
2001 University, 671 -TEN
Montreal, Quebec
Telephone : 514 315-6143
Facsimile : 514 283-3143
carol.rahall@agr.gc.ca

Canada reserves the right to revise or amend the tender documents prior to the date set for opening tenders. Such revisions and amendments, if any, will be announced by an addendum or addenda to the documents.

Tenderers are required to acknowledge receipt of all addenda to the tender documents on the Tender Form in the space provided. Failure to acknowledge all addenda may cause the tender to be rejected.

Tender Security

5. Tenders must be accompanied by security having one of the following three forms :
- (a) A Bid Bond generally in the form prescribed in Appendix "1" of the Instructions annexed hereto, executed by the tenderer and a Surety named in Appendix "4" in the Instructions annexed hereto, in the amount of 10% of the total tender.
- or alternatively**
- (b) A Security Deposit in an amount of 10% of the amount of the tender to a value of \$250,000.00, plus 5% of the amount by which the amount of the tender exceeds \$250,000.00. The Security Deposit shall take the form of either
- (i) a certified cheque payable to the Receiver General for Canada as follows :
- (A) certified cheques drawn on chartered banks, including Canadian branches of foreign banks, are acceptable as security deposits without confirmation,
- (B) certified cheques drawn on Province of Alberta Treasury Branches are acceptable as security deposits without confirmation,
- (C) certified cheques, drawn on trust companies or credit unions, provided as tender and/or contract security must be accompanied by a written statement from the institution on which the cheque is drawn



that the institution :

- if a trust company, is a member of the Canadian Payments Association;
- if a credit union, is a member of a central which is a member of the Canadian Payments Association, or is itself a member either individually or through a provincial central;

or

(ii) bonds of the Government of Canada or unconditionally guaranteed as to principal and interest by the Government of Canada, if such bonds are :

- (A) payable to bearer,
- (B) accompanied by a duly executed instrument of transfer to the Receiver General for Canada in the form prescribed by the Domestic Bonds of Canada Regulations, or
- (C) registered as to principal or as to principal and interest in the name of the Receiver General for Canada pursuant to the Domestic Bonds of Canada Regulations.

or alternatively

(c) An irrevocable bid support Letter of Credit in the form prescribed in Appendix "5" of the Instructions annexed hereto, in the amount of not less than 10% of the total tender.

**Preparation of
Tenders**

6. Tenders must be submitted on the printed form provided and must be accompanied by tender security of a form described in the immediately preceding paragraph 4.

The Tender Form provides for quotation of prices only on the scheduled items. Tenderers must quote on each item in the Unit Price Table, and failure to do so may disqualify the tender. Alternative tenders will not be considered unless specifically called for. Any alteration or additions to the pre-printed part of the Tender Form may be cause to reject the tender.

Tenders shall be submitted in sealed envelopes. The following information shall be clearly marked on the outside of the envelope :

- (i) it is a tender,
- (ii) the name of the project,
- (iii) the name and address of the tenderer.

Telegraphic or facsimile tenders will not be considered. Modifications by letter, telegraph or facsimile (514 283-3143) of tenders already submitted will be considered if received prior to the time fixed for receipt of tenders; such modifications **must only state** :

- (i) the item or items to be modified,
- (ii) the amount each item is to be modified,
- (iii) the total amount of the modification.

However, such modifications by letter, telegram or facsimile shall not reveal the amount of the original or the revised total tender.

**Signature of
Tender Form**

7. (a) Tenders must be properly completed in full compliance with the requirements indicated herein.
- (b) The signature of persons tendering must be in their respective handwriting.



- (c) The tenderer, or the person or persons duly authorized to sign on their behalf, must initial and date each and every correction, change, erasure or alteration contained in the completed tender.
- (d) LIMITED COMPANY: If the tender is made by a limited, the tender must be signed in the name of the company by the authorised signing officers should be printed in the spaces provided therefore
- (e) PARTNERSHIP: If the tender is made by a partnership, the tender must be signed in the name of the partnership by the authorised signing officer(s) of the partnership. In addition, the name of the partnership and the name(s) and title(s) of the signing officer(s) should be printed in the spaces provided therefore.
- (f) SOLE PROPRIETORSHIP: If the tender is made by an individual carrying on business as a non-limited company using their own name, a name other than their own or a firm name, the tender must be signed by the individual of the authorized signing officer(s) of the firm. . In addition, the name of the individual or of the firm and the name(s) of the signing officer(s) should be printed in the spaces provided therefore.

Withdrawal Of Tenders	3. Tenders may be withdrawn on written, telegraphic or facsimile ((514) 283-3143) request received from tenders prior to the time fixed for receipt of tenders. Negligence on the part of the tender in preparing the tender confers no right for the tender after it has been opened.
Rejection of Tenders	9. Canada reserves the right to reject any and all tenders when such rejection is in the interest of Canada.
Award of Contract	10. The contract will be awarded as soon as possible after tenders are received, provided that the lowest or any tender will not necessarily be accepted. All tender security may be held until a contract is awarded, or if no contract is awarded, until so decided by the Minister or his/ her representative.
Contract Security	<p>11. The Contractor whose tender is accepted will be required to furnish to the Minister Contract Security in accordance with the conditions as outlined in Appendix "F", entitled "Contract Security Conditions".</p> <p>When provided, any Performance Bond and Labour and Material Payment Bond shall be in the form prescribed in Appendices "2" and "3" respectively of the Instructions annexed hereto. These Bonds must be issued by one or more of the Sureties named in Appendix "4" of the Instructions annexed hereto.</p> <p>When provided, any Irrevocable Contract Support Letter of Credit shall be in the form provided in Appendix "5".</p> <p>Upon approval of the Minister, a Performance Bond and a Labour and Material Payment bond in the form prescribed above, executed by the successful tenderer and approved Surety, or alternatively, an Irrevocable Contract Support Letter of Credit, may be substituted for the Security Deposit deposited as tender security.</p>
Approved Equals	12. Requests for "Approved Equals" shall be made in writing and shall be received at least seven (7) working days prior to tender closing.
Goods and Services Tax (GST)	<p>13. For the purpose of establishing the amount of taxes that are to be included in the tender price, the Tenderer must take into account all applicable taxes.</p> <p>The Goods and Services Tax (GST), implemented January 1, 1991, is <u>NOT</u> to be considered an applicable tax for purposes of this tender.</p> <p>Any amount to be levied in respect of the GST will be billed as a separate item with each request for progress payment submitted by the Contractor. The GST levy will be paid to the Contractor in addition to the amount approved by the Engineer for work performed under the contract and will, therefore, not affect the amount of the contract. The Contractor's GST registration number must be shown on all requests for progress payments. No GST levy will</p>



be paid to the Contractor if the Contractor does not have a GST registration number.

The Contractor will be required to make the appropriate remittance to Revenue Canada in accordance with the legislation.

**Income Tax
Requirement**

14. Pursuant to paragraph 221 (1)(d) of the Income Tax Act, payments made by departments and agencies under applicable contracts (including contracts involving a mix of goods and services) must be reported on a T4A supplementary slip. To comply with this requirement, contractors are required to provide certification on the form shown in Appendix "6" in the Instructions annexed hereto within fourteen (14) calendar days of notification of contract award and within fourteen (14) calendar days immediately following any change to the information already provided under the Contract.



APPENDIX "1" OF INSTRUCTIONS TO TENDERERS

BID BOND

Bond No. : _____

Amount: _____ \$

KNOW ALL MEN BY THESE PRESENTS, that

as Principal, hereinafter called the Principal, and

as Surety, hereinafter called the Surety, are, subject to the conditions hereinafter contained, held and firmly bound unto Her Majesty the Queen in Right of Canada, Represented by the Minister of Agriculture and Agri-Food as Obligee, hereinafter called the Crown, in the amount of _____ dollars (\$ _____), lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED AND SEALED this _____ day of _____, 20____.

WHEREAS, the Principal has submitted a written tender to the Crown, dated the _____ day of _____, 20____, for

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that if:

- (a) the Principal, should his tender be accepted within the period be specified by the Crown, or, if no period be specified, within sixty (60) days after closing date of the tender, does execute within a period specified by the Crown, or, if no period be specified therein, within fourteen (14) days after the prescribed forms are presented to him for signature, execute such further contractual documents, if any, as may be required by the terms of the tender as accepted, and does furnish a Performance Bond and a Labour and Material Payment Bond, each in the amount of 50% of the Contract price and satisfactory to the Crown, or other security acceptable to the Crown, or
- (b) the Principal does pay to the Crown the difference between the amount of the Principal's tender and the amount of the Contract entered into by the Crown for the work, supplies and services which were specified in the said tender, if the latter amount be in excess of the former, then this obligation shall be void; otherwise it shall remain in full force and effect.

PROVIDED, HOWEVER, that the Surety and the Principal shall not be liable to the Crown for an amount greater than the amount specified in this bond.

PROVIDED FURTHER that the Surety shall not be subject to any suit or action unless such suit or action is instituted and process therefore served upon the Surety at its Head Office in Canada, within twelve (12) months from the date of this bond.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its authorized signing authority, the day and year first above written.

SIGNED, SEALED AND DELIVERED
in the presence of :

Principal

Witness

Surety

Note: Affix Corporate seal, if applicable.



APPENDIX "2" OF INSTRUCTIONS TO TENDERERS

PERFORMANCE BOND

Bond No. : _____

Amount: _____ \$

KNOW ALL MEN BY THESE PRESENTS, that

as Principal, hereinafter called the Principal, and

as Surety, hereinafter called the Surety, are, subject to the conditions hereinafter contained, held and firmly bound unto Her Majesty the Queen in Right of Canada, Represented by the Minister of Agriculture and Agri-Food as Obligee, hereinafter called the Crown, in the amount of : _____ dollars (\$ _____), lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED AND SEALED this _____ day of _____, 20____.

WHEREAS, the Principal has submitted a written tender to the Crown, dated the _____ day of _____, 20____, for which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, the conditions of this obligation are such that if the Principal shall well and faithfully observe and perform all the obligations on the part of the Principal to be observed and performed in connection with the Contract, then this obligation shall be void, otherwise it shall remain in full force and effect, subject, however, to the following conditions:

- (1) Whenever the Principal shall be, and declared by the Crown to be, in default under the Contract, the Surety shall
 - (a) if the work is not taken out of the Principal's hands, remedy the default of the Principal,
 - (b) if the work is taken out of the Principal's hands and the Crown directs the Surety to undertake the completion of the work, complete the work in accordance with the Contract provided that if a contract is entered into for the completion of the work
 - (i) it shall be between the Surety and the Completing Contractor, and
 - (ii) the selection of such completing contractor shall be subject to the approval of the Crown,
 - (c) if the work is taken out of the Principal's hands and the Crown, after reasonable notice to the Surety, does not direct the Surety to undertake the completion of the work, assume the financial responsibility for the cost of completion in excess of the moneys available to the Crown under the Contract,
 - (d) be liable for and pay all the excess costs of completion of the Contract, and
 - (e) not be entitled to any Contract moneys earned by the Principal, up to the date of his default on the Contract and any holdbacks relating to such earned Contract moneys held by the Crown, and the liability of the Surety under this Bond shall remain unchanged provided, however, and without restricting the generality of the foregoing, upon the completion of the Contract to the satisfaction of the Crown, any Contract moneys earned by the Principal or holdbacks related thereto held by the Crown may be paid to the Surety by the Crown.
- (2) The Surety shall not be liable for a greater sum than the amount specified in this Bond.
- (3) No suit or action shall be instituted by the Crown herein against the Surety pursuant to these presents after the expiration of two (2) years from the date on which final payment under the Contract is payable.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its authorized signing authority, the day and first above written.

SIGNED, SEALED AND DELIVERED
in the presence of :

Principal

Surety

Note: Affix Corporate seal if applicable.



APPENDIX "3" OF INSTRUCTIONS TO TENDERERS

LABOUR AND MATERIAL PAYMENT BOND

Bond No. : _____

Amount: _____ \$

KNOW ALL MEN BY THESE PRESENTS, that

as Principal, hereinafter called the Principal, and

as Surety, hereinafter called the Surety, are, subject to the conditions hereinafter contained, held and firmly bound unto Her Majesty the Queen in Right of Canada, Represented by the Minister of Agriculture and Agri-Food as Obligee, hereinafter called the Crown, in the amount of _____ dollars (\$ _____), lawful money of Canada, for the payment of which sum, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

SIGNED AND SEALED this _____ day of _____, 20_____.

WHEREAS, the Principal has submitted a written tender to the Crown, dated the _____ day of _____, 20_____, for

which Contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITIONS OF THIS OBLIGATION are such that, if payment is promptly made to all Claimants who have performed labour or services or supplied material in connection with the Contract and any and all duly authorized modifications and extensions of the Contract that may hereafter be made, notice of which modifications and extensions to the Surety being hereby waived, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions :

- (1) For the purpose of this bond, a Claimant is defined as one having a direct contract with the Principal or any Sub-Contractor of the Principal for labour, material or both, used or reasonably required for use in the performance of the Contract, labour and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone services or rental of equipment (but excluding rental of equipment where the rent pursuant to an agreement is to be applied towards the purchase price thereof) directly applicable to the Contract.
- (2) For the purpose of this Bond, no payment is required to be made in respect of a claim for payment for labour or services performed or material supplied in connection with the Contract that represents a capital expenditure, overhead or general administration costs incurred by the Principal during the currency or in respect of the Contract.
- (3) The Principal and the Surety hereby jointly and severally agree with the Crown that if any Claimant has not been paid as provided for under the terms of his contract with the Principal or a Sub-Contractor of the Principal before the expiration of a period of ninety (90) days after the date on which the last of such Claimant's labour or service was done or performed or materials were supplied by such Claimant, the Crown may sue on this bond, have the right to prosecute the suit to final judgment for such sum or sums as may be due and have execution thereon; and such right of the Crown is assigned by virtue of Part VIII of the Financial Administration Act to such Claimant.
- (4) For the purpose of this bond the liability of the Surety and the Principal to make payment to any claimant not having a contract directly with the Principal shall be limited to that amount which the Principal would have been obliged to pay to such claimant had the provisions of the applicable provincial or territorial legislation on lien or privileges been applicable to the work. A claimant need not comply with provisions of such legislation setting out steps by way of notice, registration or otherwise as might have been necessary to preserve or perfect any claim for lien or privilege which the claimant might have had. Any such claimant shall be entitled to pursue a claim and to recover judgment hereunder subject to the terms and notification provisions of the Bond.



- (5) Any material change in the Contract between the Principal and the Crown shall not prejudice the rights or interest of any Claimant under this Bond who is not instrumental in bringing about or has not caused such change.
- (6) No suit or action shall be commenced hereunder by any Claimant:
- (a) Unless such Claimant shall have given written notice within the time limits hereinafter set forth to the Principal and the Surety above named, stating with substantial accuracy the amount claimed. Such notice shall be served by mailing the same by registered mail to the Principal and the Surety at any place where an office is regularly maintained for the transaction of business by such persons or served in any manner in which legal process may be served in the Province or other part of Canada in which the subject matter of the Contract is located. Such notice shall be given
 - (i) in respect of any claim for the amount or any portion thereof required to be held back from the Claimant by the Principal or by the Sub-Contractor of the Principal under either the terms of the Claimant's Contract with the Principal or the Claimant's Contract with the Sub-Contractor of the Principal within one hundred and twenty (120) days after such Claimant should have been paid in full under this Contract,
 - (ii) in respect of any claim other than for the holdback or portion thereof referred to above within one hundred and twenty (120) days after the date upon which such Claimant did or performed the last of the service, work or labour or furnished the last of the materials for which such claim is made under the Claimant's Contract with the Principal or a Sub-Contractor of the Principal,
 - (b) After the expiration of one (1) year following the date on which the Principal ceased work on the said Contract, including work performed under the guarantees provided in the Contract,
 - (c) Other than in a court of competent jurisdiction in the province or district of Canada in which the subject matter of the Contract or any part thereof is situated and not elsewhere, and the parties hereto hereby agree to submit to the jurisdiction of such court.
- (7) The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder.
- (8) The Surety shall not be entitled to claim any moneys relating to the Contract and the liability of the Surety under this Bond shall remain unchanged and, without restricting the generality of the foregoing, the Surety shall pay all valid claims of Claimants under this Bond before any moneys relating to the Contract held by the Crown are paid to the Surety by the Crown.
- (9) The Surety shall not be liable for a greater sum than the amount specified in this bond.

IN TESTIMONY WHEREOF, the Principal has hereto set its hand and affixed its seal, and the Surety has caused these presents to be sealed with its corporate seal duly attested by the signature of its authorized signing authority, the day and first above written.

SIGNED, SEALED AND DELIVERED
in the presence of :

Principal

Surety

Witness

Note: Affix Corporate seal, if applicable.



APPENDIX "4" OF INSTRUCTIONS TO TENDERERS

LIST OF COMPANIES WHOSE GUARANTEE BONDS ARE ACCEPTABLE BY GOVERNMENT OF CANADA

1. Canadian Companies

ACE INA Insurance
AIG Insurance Company of Canada
Allstate Insurance Company of Canada
Ascentus Insurance Ltd. (Surety only)
Aviva Insurance Company of Canada
AXA Insurance (Canada)
AXA Pacific Insurance Company
Canadian Northern Shield Insurance Company
Certas Direct Insurance Company (Surety only)
Chubb Insurance Company of Canada
Co-operators General Insurance Company
CUMIS General Insurance Company
Dominion of Canada General Insurance Company (The)
Echelon General Insurance Company (Surety only)
Economical Mutual Insurance Company
Elite Insurance Company
Everest Insurance Company of Canada
Federated Insurance Company of Canada
Federation Insurance Company of Canada
Gore Mutual Insurance Company
Guarantee Company of North America (The)
Intact Insurance Company
Jevco Insurance Company (Surety only)
Missisquoi Insurance Company (The)
Nordic Insurance Company of Canada (The)
North Waterloo Farmers Mutual Insurance Company (The) (Fidelity only)
Northbridge Commercial Insurance Corporation
Northbridge General Insurance Corporation
Northbridge Indemnity Insurance Corporation
Northbridge Personal Insurance Corporation
Novex Insurance Company (Fidelity only)
Personal Insurance Company (The)
Pilot Insurance Company
Quebec Assurance Company
Royal & Sun Alliance Insurance Company of Canada
Saskatchewan Mutual Insurance Company (Fidelity only)
Scottish & York Insurance Co. Limited
Sovereign General Insurance Company (The)
TD General Insurance Company
Temple Insurance Company
Traders General Insurance Company
Travelers Insurance Company of Canada
Trisura Guarantee Insurance Company
Waterloo Insurance Company
Wawanesa Mutual Insurance Company (The)
Western Assurance Company
Western Surety Company
Wynward Insurance Group

2. Provincial Companies

Surety bonds issued by the following companies may be accepted provided that the contract of suretyship was executed in a province in which the company is licensed to do business as indicated in brackets.
ALPHA, Compagnie d'Assurances Inc. (Que.)



La Capitale General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., Que. (Surety only), Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
Coachman Insurance Company (Ont.)
Fenchurch General Insurance Company (Nfld. & Lab., P.E.I., N.B., Ont., Man., Sask., Alta., B.C.)
GCAN Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
The Insurance Company of Prince Edward Island (N.S., P.E.I., N.B.)
SGI CANADA Insurance Services Ltd. (Ont., Man., Sask., Alta.)
L'Unique General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., N.B., Que. (Surety only), Ont. (Surety only), Man., Sask., Alta., B.C. (Surety only), Nun., N.W.T., Yuk.)

3. Foreign Companies

Affiliated FM Insurance Company
Allianz Global Risks US Insurance Company (Surety only)
Allstate Insurance Company
American Bankers Insurance Company of Florida
American Road Insurance Company (The) (Surety only)
Arch Insurance Company
Aspen Insurance UK Limited
AXIS Reinsurance Company
Berkley Insurance Company
Cherokee Insurance Company (Surety only)
Compagnie Française d'Assurance pour le Commerce Extérieur (Fidelity only)
Continental Casualty Company
CorePointe Insurance Company (Surety only)
Darwin National Assurance Company (Fidelity only)
Ecclesiastical Insurance Office Public Limited Company (Fidelity only)
Employers Insurance Company of Wausau
Factory Mutual Insurance Company
Federal Insurance Company
General Reinsurance Corporation
Great American Insurance Company
Hartford Fire Insurance Company
International Insurance Company of Hannover Limited (Fidelity only)
Jewelers Mutual Insurance Company (Fidelity only)
Liberty Mutual Insurance Company
Lloyd's Underwriters
Mitsui Sumitomo Insurance Company, Limited
Motors Insurance Corporation
Munich Reinsurance America, Inc.
NIPPONKOA Insurance Company, Limited
Sentry Insurance a Mutual Company
Sompo Japan Insurance Inc.
St. Paul Fire and Marine Insurance Company
State Farm Fire and Casualty Company
Tokio Marine & Nichido Fire Insurance Co., Ltd.
Triton Insurance Company (Fidelity only)
Westport Insurance Corporation
XL Insurance Company Limited (Surety only)
Zurich Insurance Company Ltd.

Revised – August 2013



APPENDIX "5" OF INSTRUCTIONS TO TENDERERS

Use of Irrevocable Letters of Credit for Tender or Contract Security for Federal Government Contracts.

1. Definitions

For the purpose of these instructions:

- 1.1 a Letter of Credit means any arrangement, however named or described, whereby a financial institution, acting at the request and on the instructions of a Contractor, or on its own behalf, is to make a payment to or to the order of Her Majesty, as the beneficiary, or is to accept and pay bills of exchange drawn by Her Majesty, provided that the terms and conditions of the letter of credit are complied with.
- 1.2 a Bid Support Letter of Credit is a letter of credit pursuant to which demand may be made if the proposed Contractor refuses or fails to enter into a written contract in accordance with the terms and conditions of the bid or fails to provide the required contract security.
- 1.3 a Contract Support Letter of Credit is a letter of credit pursuant to which demand may be made if the Contractor, having entered into a contract with Her Majesty, does not perform the contract in accordance with the terms and conditions of that contract.
- 1.4 the expression "Member of the Canadian Payments Association", is defined in the Canadian Payments Association Act.
- 1.5 the expression "UCP" means the International Chamber of Commerce (ICC) Uniform Customs and Practice for Documentary Credits, 1993 Revision, ICC Publication No. 500.

2. Form of Letter of Credit

2.1 A letter of credit shall:

- (a) clearly specify that it is irrevocable or is deemed to be irrevocable pursuant to article 6 (c) of the UCP;
- (b) be issued by a financial institution which is a member of the Canadian Payments Association or issued by a financial institution confirmed by a financial institution that is a member of the Canadian Payments Association;
- (c) state the face amount which may be drawn against it;
- (d) state its expiry date (date to be 60 days beyond the specified contract completion date);
- (e) 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 officer;
- (f) 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;
- (g) provide that it is subject to the International Chamber of Commerce (ICC) Uniform Customs and Practice for Documentary Credits, 1993 Revision, ICC Publication No. 500.



3. Payment of a Letter of Credit

- 3.1 After an offer is accepted within the specified time after the closing date for bidding, and if the contractor refuses to enter into the contract or refuses or is unable to furnish any required contract security or contract support letter of credit, Her Majesty may demand payment under the bid support letter of credit in accordance with its terms. Proceeds from the letter of credit shall be applied in accordance with the terms and conditions governing the bid solicitation.
- 3.2 During the performance of a contract, if the contractor does not comply with all the terms and conditions of the contract, Her Majesty may demand payment under the contract support letter of credit in accordance with its terms. Proceeds from the letter of credit shall be applied in accordance with the terms and conditions of the contract.



APPENDIX "6" OF INSTRUCTIONS TO TENDERERS

The Contractor shall complete and submit this T4-A Certification within fourteen (14) calendar days of Notification of Contract award and within fourteen (14) calendar days immediately following any change to the information already provided under the Contract. Failure to provide this information or failure to provide the correct information shall result in a fundamental breach of the Contract.

1. **The Contractor shall enter a [x] in one of the boxes below opposite the description that best describes its status.**

- ☐ A business incorporated either federally or provincially;
☐ An unincorporated business, either as a sole proprietor or a partnership; or
☐ An individual.

Note: The information provided in Section 2 must correspond with that provided in Section 1.

Corporate or unincorporated business or individual's name: _____

Street Name or Box #: _____

City, Town or Village: _____

Province: _____

Postal Code: _____

2. **Contractor shall complete Section 2(a) or 2(b) or 2(c), whichever is applicable to its situation.**

- (a) If incorporated:

Business Number (BN): _____, or
GST / HST Number: _____, or
T2 Corporation Tax Number (T2N): _____, whichever is applicable

- (b) If unincorporated:

Social Insurance Number (SIN): _____, and
Business Number (BN): _____, or
GST / HST Number: _____, whichever is applicable

Note: The Unincorporated Business Name must be the same as the name associated with the Revenue Canada Business Number or the GST Number.

- (c) If individual:

Social Insurance Number (SIN): _____, and
Business Number (BN): _____, or
GST / HST Number: _____, whichever is applicable

Note: The Individual's Name must be the same as the name associated with the Social Insurance Number.

3. **WE HEREBY CERTIFY that I/We have examined the information provided above, including the legal name, address and Revenue Canada identifier (SIN, BN, GST / HST No., T2N), as applicable, and that it is correct and complete, and fully discloses my/our identification.**

Contractor's signature Title of Signatory Date



APPENDIX "A"

SPECIFICATIONS

Mechanical Specifications

Electrical Specifications

&

Architectural Specifications

AAFC LONDON	SPECIFICATION	SECTION 00 00 00
Cold/Growth Rooms Project	TITLE SHEET	PAGE 1
		2013-12-19

PROJECT TITLE AGRICULTURE AND AGRI-FOOD CANADA
SOUTHERN CROP PROTECTION & FOOD RESEARCH CENTRE
1391 Sandford Street

4 COLD ROOMS AND
1 GROWTH ROOM PROJECT

PROJECT NUMBER AAFC

CHORLEY + BISSET
CONSULTING ENGINEERS
PROJECT NUMBER 7259

REICH + PETCH
ARCHITECTS INC.
PROJECT NUMBER 1314

SUBMISSION DATE 2013-12-19 (Issued For Bid)

END OF SECTION

Architect



Mechanical Engineer



Electrical Engineer



END OF SECTION

<u>Section</u>	<u>Title</u>	<u>Pages</u>
<u>Division 00 - Procurement and Contracting Requirements</u>		
00 00 00	SPECIFICATION TITLE SHEET	1
00 01 11	LIST OF CONTENTS	1
<u>Division 01 - General Requirements</u>		
01 11 01	GENERAL INSTRUCTIONS MINOR WORKS	10
01 35 29	HEALTH AND SAFETY REQUIREMENTS	4
01 35 35	FIRE SAFETY REQUIREMENTS	5
<u>Division 03 - Concrete</u>		
03 30 11	CAST-IN-PLACE CONCRETE	4
<u>Division 05 - Metals</u>		
05 50 01	METAL FABRICATIONS	4
<u>Division 09 - Finishes</u>		
09 96 57	EPOXY COATING FOR FLOORS	3
<u>Division 13 - Special Construction</u>		
13 03 00	WALK-IN COLD AND GROWTH ROOMS	22
<u>Division 21 - FIRE SUPPRESSION</u>		
Refer to C+B Specifications		
<u>Division 22 - PLUMBING</u>		
Refer to C+B Specifications		
<u>Division 23 - HEATING, VENTILATING AND AIR CONDITIONING</u>		
Refer to C+B Specifications		
<u>Division 26 - ELECTRICAL</u>		
Refer to C+B Specifications		

END OF SECTION

PART 1 - GENERAL

1.1 MINIMUM STANDARDS

- .1 Execute work to meet or exceed:
 - .1 National Building Code of Canada 2010, National Fire Code of Canada 2010, Ontario Building Code 2012 and any other code of provincial or local application, including all amendments up to project date, provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
 - .2 Rules and regulations of authorities having jurisdiction.
 - .3 Federal Fire Commissioner, No. 301, Standard for Construction Operations, and No. 302, Standard for Welding and Cutting, June 1982.
 - .4 Treasury Board of Canada Secretariat, Fire Protection Standard, April 1, 2010.
 - .5 Observe and enforce construction safety measures required by National Building Code 2010, Part 8 Safety Measures at Construction and Demolition Sites, Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, O. Reg. 213/91 as amended by O. Reg. 631/94, O. Reg. 143/99, O. Reg. 571/99, O. Reg. 145/00, O. Reg. 527/00, R.R.O. 1990, Reg. 834, O. Reg. 278/05 (Asbestos), Workplace Safety and Insurance Board and municipal statutes and authorities.
 - .6 Environmental Protection Act, O. Reg. 102/94 and O. Reg. 103/94.
 - .7 Comply with CSA B651-12, Accessible Design for the Built Environment, unless specified otherwise. In any case of conflict or discrepancy between the building codes and CSA B651, the requirements of CSA B651 shall apply.

1.2 AUTHORITIES HAVING JURISDICTION

- .1 The Federal Fire Commissioner is the sole authority having jurisdiction over this project with regards fire standards.
- .2 Fire Testing requirements are for ULC or WHI listed and labelled products.
- .3 Substitution of ULI or other Fire testing reports for required ULC and WHI testing is acceptable to the Departmental Representative only if the issuing organization is accredited and listed in the "Directory of Accredited Certification Organizations (CAN-P-1505C), 1993" published by the Standards Council of Canada, 1-800-267-8220. Testing shall be to the Canadian standards and the tested products shall bear the

- appropriate label approved by the Federal Fire Commissioner.
- .4 Submit 3 copies of test reports under the letterhead of the accredited organization to the Departmental Representative.

1.3 NOT USED

1.4 TAXES

- .1 Pay applicable Federal, Provincial and Municipal taxes.

1.5 FEES, PERMITS, CERTIFICATES AND LETTERS

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates, permits and letters required.
- .3 NOT USED.
- .4 Obtain Federal Fire Commissioner Inspection Letter of Deficiencies from Departmental Representative. Submit a copy of the FFC letter with a list of remedial measures taken to correct deficiencies.
- .5 Furnish certificates, permits and letters when requested.

1.6 EXAMINATION

- .1 Examine existing conditions and determine conditions affecting work.

1.7 DOCUMENTS

- .1 Keep one copy of contract documents [and shop drawings] on the site.

1.8 ELECTRONIC SUBMITTALS

- .1 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, [MS Project] and Autocad dwg files; on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.9 CONTRACTOR'S AS-BUILT DRAWINGS AND SPECIFICATIONS

- .1 As work progresses, neatly record significant deviations from the Contract drawings and specifications using fine, red marker on full size white prints and specifications. Make the same changes on the electronic files.
- .2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each title block note: "AS BUILT". Also circle on List of Drawings each title and number of drawing marked with "AS-BUILT" information. Circle on Table of Contents each specification section number and title of specification sections marked with "AS-BUILT" information.
- .3 NOT USED.
- .4 Record following significant deviations:
 - .1 Depths of various elements of foundation.
 - .2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 - .4 Field changes of dimension.
 - .5 Other significant deviations which are concealed in construction and can not be identified by visual inspection.
 - .6 Alternative materials and systems installed replacing original materials and systems specified by trade name.
- .5 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit pdf files on USB compatible with PWGSC encryption requirements, through email or alternate electronic file sharing service such as ftp.
- .6 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.10 OPERATIONS, MAINTENANCE DATA AND TRAINING

- .1 On completion of project submit to Departmental Representative 4 copies of Operations and Maintenance Data assembled in four 255 x 295 mm vinyl-covered, 3-ring, loose-leaf binders with title sheet labelled "Operations Data and Maintenance Manual", project title, date and list of contents. Organize content into applicable sections between hard paper dividers with labelled

tabs.

- .2 Include in each binder [maintenance instructions for finished surfaces,] [warranties and guarantees in form approved by Departmental Representative] [and] [operations and maintenance data for equipment and systems with parts list, suppliers' names and addresses], [hardware schedule,] [schematic diagrams for electrical hardware,] complete set of final shop drawings (bound separately), names, addresses and phone numbers of sub-contractors and suppliers, list of materials with names of manufacturer and source of supply. Neatly type lists and rates. Use clear drawings, diagrams or manufacturer's literature.
- .3 Contractor to provide necessary training for all equipment installed under this project

1.11 SHOP DRAWINGS AND PRODUCT DATA SHEETS

- .1 Prior to submission check and certify as correct, shop drawings and product data sheets. Issue to Departmental Representative each submission at least 14 days before dates reviewed submission will be needed.
- .2 Where technical sections specify that shop drawings bear the stamp of a Registered Professional Engineer, the Engineer must be registered in the Province of Ontario.
- .3 Submit [3 prints and 1 electronic copy] of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .4 Submit [3 prints and 1 electronic] copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .5 NOT USED.
- .6 Submit [3 prints and 1 electronic] of product data sheets for standard manufactured items. Indicate VOC's in g/l for adhesives, primers, sealants, paints, curing and sealing compounds, sealers, particleboard, plywood, preserved wood, and any other product that emits more than 25 g/l VOC during application, curing, initial off gassing or end use.
- .7 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by

Departmental Representative's review of submittals.

1.12 NOT USED.

1.13 DESIGN DATA, TEST REPORTS, CERTIFICATES, MANUFACTURER'S INSTRUCTIONS, MANUFACTURER'S FIELD REPORTS

- .1 Prior to submission check and certify as correct each submission. Issue to Departmental Representative each submission at least 14 days before reviewed submission will be needed.
- .2 Submit 3 white print copies of each item requested.
- .3 For products bearing the 'Ecologo' of the Environmental Choice Program, Environment Canada, Canadian Environmental Protection Act, Environmental Choice Product Guidelines:
 - .1 Submit two copies of the licensing criteria statements and the verification of compliance with Sections 3(a) and 3(b) of the ECP to the Departmental Representative. For adhesives, paints, primers and sealants, cleaners and degreasers, floor polishes, water borne surface coatings, indicate VOC in g/l.
 - .2 Alternatively, material in original containers bearing the 'Ecologo' or products bearing the 'Ecologo' will satisfy this requirement.
- .4 Responsibility for errors, omissions or deviations from requirements of Contract Documents is not relieved by Departmental Representative's review of submittals.

1.14 SAMPLES

- .1 Submit duplicate samples [in full range of colours].
- .2 Identify manufacturer's name, product and [colour].
- .3 Installed work shall match reviewed sample.

1.15 ADDITIONAL DRAWINGS

- .1 Departmental Representative may furnish additional drawings to clarify work.
- .2 Such drawings become part of Contract Documents.

1.16 PROTECTION

- .1 Protect existing work from damage.
- .2 Replace damaged existing work with material and finish to match original.
- .3 NOT USED.
- .4 Cover furniture and fittings prior to commencing work.
- .5 Remove coverings and clean following completion of work.
- .6 Provide temporary, non-combustible, steel stud and drywall dustproof partitions between occupied and work areas. Maintain access to fire exits and washroom facilities. Remove partition on completion of work. (If required)

1.17 EXISTING SERVICES

- .1 Establish location, protect and maintain existing utility lines.
- .2 Maintain existing services in occupied areas.
- .3 Use designated existing sanitary facilities.
- .4 Use existing water and electrical services at no cost.

1.18 TEMPORARY FACILITIES AND SERVICES

- .1 Provide and maintain temporary facilities and services required to carry out work.
- .2 Remove temporary facilities and services on completion of work.

1.19 NOISE-GENERATING WORK

- .1 Perform Noise-generating work outside of core operational hours. Core operational hours are Mon-Fri, 8:00am - 4:30pm.

1.20 MATERIAL AND EQUIPMENT

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.

- .3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.21 CONCEALMENT

- .1 Conceal pipes, ducts, conduits and wiring in finished areas.

1.22 CUTTING AND REMEDIAL WORK

- .1 Co-ordinate work to keep cutting and remedial work to a minimum.
- .2 Execute cutting and remedial work required. Notify Departmental Representative before cutting, boring or sleeving structural members.
- .3 Prior to cutting or drilling horizontal or vertical surfaces including concrete, concrete block or other structural substrate, determine location of reinforcing, service lines, pipes, conduits or other items by x-ray, ground penetrating radar or other appropriate method. Submit findings to Departmental Representative prior to cutting or drilling.
- .4 Do not cut, puncture or drill any member of ceiling system which forms part of an integrated assembly with mechanical or electrical components.
- .5 Use specialists in affected material to execute cutting and remedial work.
- .6 Match work to adjoining construction and finishes.
- .7 Fit components tight to adjoining surfaces.
- .8 Make good surfaces exposed or disturbed by work with material and finish to match existing adjoining surfaces.
- .9 After patching wall, ceiling or other painted surfaces, paint the entire wall or area up to the next change in plane or direction as directed by Departmental Representative.

1.23 FASTENINGS

- .1 Provide fastenings of type, size and spacing required to assure secure anchorage.

- .2 Obtain Departmental Representative's permission before using explosive actuated fasteners.

1.24 CO-ORDINATION AND CO-OPERATION

- .1 Site will be occupied during execution of work.
- .2 Building will be occupied during execution of work.
- .3 Work area will not be occupied during execution of work.
- .4 Execute work with minimum disturbance to occupants and normal use of building and work area.
- .5 Maintain access and exits.
- .6 Where security has been reduced by work of contract, provide temporary means to maintain security.

1.25 NOT USED.

1.26 NOT USED.

1.27 TEMPORARY SIGNS

NOT USED.

1.28 INSPECTION AND TESTING

- .1 When initial tests and inspections reveal work not to contract requirements, pay for tests and inspections required by Departmental Representative on corrected work.

1.29 COST BREAKDOWN

- .1 Within 48 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract price.
- .2 Show separately cost of equipment purchased exempt from Ontario Retail Sales Tax under your Ontario Sales Tax licence number.
- .3 Within 48 hours of acceptance of bid submit a list of subcontractors.

1.30 SCHEDULING

- .1 On award of contract submit bar chart construction schedule for work, indicating anticipated progress stages within time of completion. When schedule has been reviewed by the Departmental Representative take necessary measures to complete work within scheduled time. Do not change schedule without notifying Departmental Representative.

1.31 CLEANING

- .1 Maintain project free of accumulated waste and rubbish.
- .2 Final cleaning:
 - .1 Remove temporary protection.
 - .2 Remove dust, dirt and foreign matter from surfaces. HEPA vacuum interior surfaces.
 - .3 Polish [new] glass and metal surfaces.
 - .4 Broom clean paved exterior surfaces, rake clean other exterior surfaces.

1.32 NOT USED

1.33 NOT USED

1.34 DESIGNATED SUBSTANCES

- .1 NOT USED.

1.35 HALOCARBONS

- .1 Comply with Federal Halocarbon Regulations 2003 under the Canadian Environmental Protection Act 1999, EPAM and PWGSC Ontario Region Halocarbon Information Sheet dated March 2010.

1.36 SPECIAL PROTECTION AND PRECAUTIONS

- .1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of material safety data sheets acceptable to HRSDC - Labour Program.

1.37 IAQ - INDOOR AIR QUALITY

- .1 Comply with CSA Z204-94(R1999), Guideline for Managing Indoor Air Quality in Office Buildings.

1.38 POLLUTION CONTROL

- .1 Spills of deleterious substances:
 - .1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
 - .2 Report immediately to Ontario Spills Action Centre: 1-800-268-6060.
 - .3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Cash allowances.

1.2 CASH ALLOWANCES

- .1 Include in Contract price, cash allowances stated herein.
- .2 Cash allowances, unless otherwise specified, cover net cost to Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage and other authorized expenses incurred in performing Work.
- .3 Contract Price, and not cash allowance, includes Contractor's overhead and profit in connection with such cash allowance.
- .4 Contract Price will be adjusted by written order to provide for an excess or deficit to each cash allowance.
- .5 Where costs under a cash allowance exceed amount of allowance, Contractor will be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out in Contract Documents.
- .6 Progress payments on accounts of work authorized under cash allowances shall be included in Departmental Representative's monthly certificate for payment.
- .7 Schedule shall be prepared jointly by Departmental Representative and Contractor to show when items called for under cash allowances must be authorized by Departmental Representative for ordering purposes so that progress of Work will not be delayed.
- .8 Amount of each allowance, for Work specified in respective specification Sections is as follows:
 - .1 For tie-in of all new doors security system with building's existing CHUBB security system, supply and install card readers and electric strikes: Include an allowance of \$ 10000.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA): Canada
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code 2010 (NBC):
 - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2010 (NFC):
 - .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .4 Province of Ontario:
 - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 Municipal statutes and authorities.
- .5 Treasury Board of Canada Secretariat (TBS):
 - .1 Treasury Board, Fire Protection Standard April 1, 2010 www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316§ion=text.
- .6 Fire Commissioner of Canada (FCC):
 - .1 FC-301 Standard for Construction Operations, June 1982.
 - .2 FC-302 Standard for Welding and Cutting, June 1982.

Labour Program
Fire Protection Engineering Services
4900 Yonge Street 8th Floor
North York, Ontario M2N 6A8

and copies may be obtained from:

Human Resources and Social Development Canada
Labour Program
Fire Protection Engineering Services
Ottawa, Ontario K1A 0J2

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 11 01.
- .2 Submit site-specific Health and Safety Plan: Within [7] days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operations [found in work plan] [_____].
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
- .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 14 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 10 days after receipt of comments from Departmental Representative.
- .4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .5 Submit names of personnel and alternates responsible for site safety and health.
- .6 Submit records of Contractor's Health and Safety meetings [when requested].
- .7 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, at construction meeting.
- .8 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .9 Submit copies of incident and accident reports.
- .10 Submit Material Safety Data Sheets (MSDS).
- .11 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.

1.3 NOT USED

1.4 NOT USED

1.5 SAFETY ASSESSMENT

- .1 Perform site specific safety hazard assessment related to project.

1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.7 REGULATORY REQUIREMENTS

- .1 Comply with the Acts and regulations of the Province of Ontario.
- .2 Comply with specified standards and regulations to ensure safe operations at site.

1.8 NOT USED

1.9 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.
- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter O.1, as amended.

1.11 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act for the Province of Ontario.

1.12 UNFORSEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.
- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Existing Facility Fire safety plan.

1.2 GENERAL

- .1 This section specifies general requirements and procedures for fire safety. Additional requirements may be specified in individual sections elsewhere in specifications.

1.3 REPORTING FIRES

- .1 The Departmental Representative will co-ordinate arrangements for the Contractor to be briefed at the pre-construction meeting concerning Building's fire safety protocol.
- .2 Building Manager will supply a copy of "Fire Safety Emergency Evacuation Plan" in effect for this building. Contractor shall comply with outlined fire safety requirements.
- .3 Know location of nearest fire alarm box and telephone, including emergency phone number.
- .4 Report immediately all fire incidents to Fire Department as follows:
 - .1 activate nearest fire alarm box; or
 - .2 telephone.
- .5 Person activating fire alarm box will remain at box to direct Fire Department to scene of fire.
- .6 When reporting fire by telephone, give location of fire, name or number of building and be prepared to verify the location.

1.4 FIRE WATCH

- .1 Appoint a Fire Watch at locations where welding and soldering, torching or roofing is to take place.
- .2 A dedicated Fire Watch is not required. A competent person from the workforce on site may be assigned as Fire Watch for duration

of work.

- .3 Assign a person who is knowledgeable in the correct use of fire extinguishers on the project.
- .4 Have work inspected by the Fire Watch up to 1.0 hours after work stoppage for each work period.
- .5 Welding to be completed half hour prior to leaving site

1.5 INTERIOR AND EXTERIOR FIRE PROTECTION AND ALARM SYSTEMS

- .1 Fire protection and alarm system will not be:
 - .1 obstructed;
 - .2 shut-off; or
 - .3 left inactive at end of working day or shift.
- .2 Fire hydrants, standpipes and hose systems will not be used for other than fire-fighting purposes unless authorized by Departmental Representative.
- .3 Provide and maintain free access to fire extinguishing equipment. Maintain exit facilities. Keep means of egress free from materials, equipment and obstructing.

1.6 FIRE EXTINGUISHERS

- .1 Supply fire extinguishers, as necessary to protect work in progress and contractor's physical plant on site.

1.7 NOT USED

1.8 BLOCKAGE OF ROADWAYS

- .1 Advise Departmental Representative of any work that would impede fire apparatus response. This includes violation of minimum required overhead clearance.

1.9 SMOKING PRECAUTIONS

- .1 Smoking is not permitted within areas of work or site storage.

1.10 RUBBISH AND WASTE MATERIALS

- .1 Rubbish and waste materials are to be kept to a minimum.

- .2 Burning of rubbish is prohibited.
- .3 Remove all rubbish from work site at end of work day or shift or as directed.
- .4 Storage:
 - .1 Store oily waste in approved receptacles to ensure maximum cleanliness and safety.
 - .2 Deposit greasy or oily rags and materials subject to spontaneous combustion in approved receptacles and remove from site daily or at the end of each shift.

1.11 FLAMMABLE AND COMBUSTIBLE LIQUIDS

- .1 Handling, storage and use of flammable and combustible liquids are to be governed by the current National Fire Code of Canada.
- .2 Flammable and combustible liquids such as gasoline, kerosene and naphtha will be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing Underwriters' Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable and combustible liquids exceeding 45 litres for work purposes requires permission of local Building Manager.
- .3 Transfer of flammable and combustible liquids is prohibited within buildings or jetties.
- .4 Transfer of flammable and combustible liquids will not be carried out in vicinity of open flames or any type of heat-producing devices.
- .5 Flammable liquids having a flash point below 38°C such as naphtha or gasoline will not be used as solvents or cleaning agents.
- .6 Flammable and combustible waste liquids, for disposal, will be stored in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and Fire Department is to be notified when disposal is required.

1.12 HAZARDOUS SUBSTANCES

- .1 Work entailing use of toxic or hazardous materials, chemicals and/or explosives, or otherwise creating hazard to life, safety or health, will be in accordance with National Fire Code of Canada.

- .2 Obtain from local Building Manager a "Hot Work" permit for work involving welding, burning or use of blow torches and salamanders, in building or facility.
- .3 When Work is carried out in dangerous or hazardous areas involving use of heat, provide fire watchers equipped with sufficient fire extinguishers. Determination of dangerous or hazardous areas along with level of protection necessary for Fire Watch is at discretion of the local Building Manager. Contractors are responsible for providing fire watch service for work on a scale established and in conjunction with Building Manager at pre-construction meeting.
- .4 Where flammable liquids, such as lacquers or urethanes are to be used, proper ventilation will be assured and all sources of ignition are to be eliminated. Building Manager is to be informed prior to and at cessation of such work.

1.13 WELDING, BURNING AND CUTTING

- .1 Contractor performing work of this section must notify Departmental Representative in advance of commencing work.
- .2 Use non-combustible shields for electric and gas welding or cutting executed within 3 m of combustible material or in occupied spaces.
- .3 Place cylinders supplying gases as close to work as possible. Secure cylinders in upright position, free from exposure to sun or high temperature.
- .4 Locate fire extinguishing equipment near all welding, cutting and soldering operations.
- .5 Contractor's mechanics shall be properly equipped with required protective clothing, including goggles or welding hood or face mask, gloves, etc.
- .6 Contractor is responsible for the protection of his work and the Departmental Representative 's property.
- .7 Provide Fire Watch on standby with approved fire extinguisher while burning or welding is in progress.
- .8 Welding to be completed half hour prior to leaving site

1.14 QUESTIONS AND/OR CLARIFICATIONS

- .1 Direct any questions or clarification on Fire Safety in addition to above requirements to local Building Manager.

1.15 FIRE INSPECTION

- .1 Site inspections by Building Manager will be coordinated through Departmental Representative.
- .2 Allow local Building Manager unrestricted access to work site.
- .3 Co-operate with Building Manager during routine fire safety inspection of work site.
- .4 Immediately remedy all unsafe fire situations observed by Building Manager.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 05 50 01 Metal Fabrications
- .2 09 96 57 Epoxy Coating For Floors

1.2 ACTION AND INFORMATION SUBMITTALS

- .1 Provide testing and inspection results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.

1.3 ENVIRONMENTAL CHOICE PROGRAM

- .1 Provide sealant and polyethylene products bearing the 'Ecologo' of the Environmental Choice Program, Department of the Environment, Canadian Environmental Protection Act, Certification Criteria Document CCD-045-95 Sealants and Caulking Compounds, and CCD-126-95 Plastic Film Products.
- .2 Submit two copies of the licensing criteria statements and the verification of compliance with Sections 3(a) and 3(b) of the CCD to the Departmental Representative in accordance with Section [01 11 01] [s 01 33 00 and 01 45 00]. Alternatively, material in original containers bearing the 'Ecologo' or products bearing the 'Ecologo' will satisfy this requirement. For primers and sealants, indicate VOC in g/l during application and curing.

1.4 NOT USED

1.5 ACRONYMS AND TYPES

- .1 Cement: hydraulic cement or blended hydraulic cement (XXb - where b denotes blended).
 - .1 Type GU or GUb - General use cement.
 - .2 Type MS or MSb - Moderate sulphate-resistant cement.
 - .3 Type MH or MHb - Moderate heat of hydration cement.
 - .4 Type HE or Heb - High early-strength cement.
 - .5 Type LH or LHb - Low heat of hydration cement.
 - .6 Type HS or HSb - High sulphate-resistant cement.

- .2 Fly ash:
 - .1 Type F - with CaO content less than 8%.
 - .2 Type CI - with CaO content ranging from 8 to 20%.
 - .3 Type CH - with CaO greater than 20%.
- .3 GGBFS - Ground, granulated blast-furnace slag.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Concrete: mix proportion method Alternative 1 to CSA A23.1-09/A23.2-09, Concrete materials and methods of concrete construction.
 - .1 Cement: to CAN/CSA-A3000-08, type GU.
 - .2 Compressive strength: 30 MPa at 28 days.
 - .3 Exposure class: C-XL to CSA A23.1-09/A23.2-09.
 - .4 Aggregate size: 10 mm maximum size to CSA A23.1-09/A23.2-09.
 - .5 Slump: 70 mm+/-20 mm at time of deposit.
 - .6 Air content: Table 4, Category 1, 6%.
 - .7 Admixtures: air entraining to ASTM C233/C233M-11 Standard Test Method for Air-Entraining Admixtures for Concrete. Calcium chloride or compounds containing calcium chloride not permitted.
 - .8 Water: potable, to Table 9.
- .2 Fibre reinforcing: polyethylene terephthalate, to ASTM C1116/C1116M-10a, engineered and designed for use in concrete, with the following properties:
 - .1 Specific Gravity: 1.34
 - .2 Tensile Strength: 130-160 kSI.
 - .3 Fibre Length: 19-38 mm.
 - .4 Fibre Denier: 16-60.
 - .5 Type of Filament: monofilament.
 - .6 Acceptable material: 'Nurlon Fiber' distributed by NU-Tech Fiber-Con Inc., 416-663-5123; and 'Lo Mod Fibre' manufactured by Gemite Products Inc. 905-672-2020.
- .3 Anchor bolts: to CSA G40.20-04(R2009)/ G40.21-04(R2009), Grade 300W, minimum 30% recycled content.

PART 3 - EXECUTION

3.1 PLACING AND INSTALLATION

- .1 Do concrete work in accordance with CSA A23.1-09/A23.2-09.
- .2 Provide 25 mm chamfer on exposed corners.
- .3 Build-in items supplied by other Sections.
- .4 Anchor bolts:
 - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
 - .2 With approval of Departmental Representative, grout anchor bolts in preformed holes or holes drilled after concrete has set. Formed holes to be minimum 100 mm diameter. Drilled holes to manufacturers's recommendations.
 - .3 Set bolts and fill holes with shrinkage compensating grout.
- .5 Grout structural steel base plates in place.
- .6 Maintain concrete encased air ducts in place.

3.2 FINISHING

- .1 Finish concrete in accordance with CSA A23.1-09/A23.2-09.
- .2 Formed surfaces exposed to view: sack rubbed finish in accordance with CSA A23.1-09/ A23.2-09.
- .3 Interior floor slabs to be left exposed or to receive epoxy, carpet, sheet vinyl or other covering requiring a smooth surface: initial finishing operations followed by final finishing comprising mechanical floating and steel trowelling in accordance with CSA A23.1-09/ A23.2-09 Table 22 to produce hard, smooth, dense steel trowelled surface free from blemishes; finish classification Class D.
- .4 Hardened floor finish: as specified in 3.2.3 immediately above in conjunction with application of hardener applied [2.44] kg/m².
- .5 Depressions in floors between high spots not greater than 5 mm below a 3 m straight edge and in accordance with CSA A23.1-09/A23.2-09, Clause 7.5.1.2 and Table 22, finish classification Class B.

3.3 CURING

- .1 Cure concrete in accordance with CSA A23.1-09/A23.2-09, Clause 7.4 Table 20, type 1-Basic and Appendix D

3.4 FLOOR SEALER

- .1 Apply concrete floor sealer to concrete floor slabs [except slabs to receive epoxy finish] in accordance with manufacturer's instructions.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 American National Standards Institute (ANSI):
 - .1 ANSI/NAAMM MBG 531-09, Metal Bar Grating Manual.
- .2 American Society for Testing and Materials International, (ASTM):
 - .1 ASTM A47/A47M-99(2009), Ferritic Malleable Iron Castings.
 - .2 ASTM A123/A123M-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A269-10, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
 - .4 ASTM A536-84(2009), Standard Specification for Ductile Iron Castings.
 - .5 ASTM A627-03(2011), Standard Test Methods for Tool-Resisting Steel Bars, Flats, and Shapes for Detention and Correctional Facilities.
 - .6 ASTM A666-10, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - .7 ASTM A786-05(2009)/A786M-05(2009), Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates.
 - .8 ASTM A1011/A1011M-12, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
 - .9 ASTM B36/B36M-08a, Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar.
 - .10 ASTM B135M-10, Standard Specification for Seamless Brass Tube, Metric.
 - .11 ASTM F593-02(2008)e1, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
 - .12 ASTM F1267-12, Standard Specification for Metal, Expanded, Steel.
- .3 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating
- .4 Canadian Standards Association (CSA):
 - .1 CSA B651-12, Accessible Design for the Built Environment.
 - .2 CSA G40.20-04(2009)/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality

Steel/Structural Quality Steel.

.3 CAN/CSA-W59-03(R2008), Welded Steel Construction (Metal Arc Welding).

.5 The Master Painters Institute (MPI) / Architectural Painting Specification Manual - February 2004.

.1 MPI #79 - Primer, Alkyd, Anti-Corrosive for Metal.

.6 National Association of Architectural Metal Manufacturers (NAAMM):

.1 NAAMM AMP-92, Metal Stair Manual.

1.2 DESIGN REQUIREMENTS

.1 Design [[counter][writing desk] brackets,] [[steel][brass] handrails and railings,] [handrail extensions] [gratings,] [trench covers and frames,] [stairs and landings] [and] [bench brackets] in accordance with CSA B651.

1.3 SUBMITTALS

.1 Submit shop drawings and product data of each item specified in accordance with Section [01 11 01] [s 01 33 00 and 01 78 00].

.1 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details and accessories.

.2 Indicate each item's conformance with CSA B651.

.3 Each shop drawing submission shall bear signature and stamp of qualified professional engineer registered or licensed in province of Ontario.

.2 Submit [300 mm] long sample of each [brass] [bronze] finish.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Stainless steel sheet, strip, plate and flat bar: to ASTM A666, type 304, AISI No. 4 finish, minimum 75% recycled content.

.2 Stainless steel tubing: to ASTM A269, Type 304, minimum 75% recycled content, seamless or welded with AISI No. 4 finish.

- .3 SS bolts, nuts and washers: stainless steel to ASTM F593, minimum 75% recycled content.
- .4 Steel: to CSA G40.20/G40.21, Grade 300W, minimum 30% recycled content.
- .5 Hollow Structural Sections (HSS): to CSA G40.20/G40.21, Grade 350W, Class H, minimum 30% recycled content.
- .6 Tool resisting steel bars (round and flat): to ASTM A627, Security Grade 1.
 - .1 Composite T.R. Steel, maximum HRC-45.
 - .2 Nominal diameter or cross section: 25.4 mm round, 9.5 x 63.5 mm bars.
- .7 Alkyd primer: to MPI #79, E3 environmental rating.
- .8 Galvanizing: hot dip, unpassivated, to ASTM A123/A123M, Coating Grade 85, minimum 600 g/m².
- .9 Zinc rich primer for galvanized surfaces: zinc rich, readymix to CAN/CGSB-1.181, Ecologo certified.
- .10 Grout: non-shrink, non-metallic, flowable, 24 h, 15 MPa, pullout strength 7.9 MPa.

2.2 FABRICATION

- .1 Fit joints in true planes and securely fasten.
- .2 Weld to CSA W59. File or grind welds smooth and flush with adjoining surface.
- .3 Fabricate gratings within limits given in Metal Bar Grating Manual, Revised 1979.
- .4 Shop assemble work.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Supply other sections with templates, instructions and built-in items.

- .2 Install work straight, plumb and level to a tolerance of 1:600.
- .3 Provide required reinforcing and anchorage.

3.2 STAINLESS STEEL GRATES

- .1 Supply concrete section with steel angles for embedding in concrete c/w weld anchors. Galvanize after fabrication
- .2 Fabricate gratings with stainless steel 25x25x6mm frame and 25x3mm flat bar welded to frame at 25mm spacing. Smooth welds after fabrication
- .3 Fabricate trench covers in three 750mm +/- removable lengths.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Not used.

1.2 PRODUCT DATA SHEETS

- .1 Submit product data sheets in accordance with Section 01 11 01

1.3 WHMIS

- .1 Submit two copies of MSDS - Material Safety Data Sheets to Departmental Representative.
- .2 Indicate VOC's during application.
- .3 Enforce use of personal protective equipment required by MSDS.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 11 01
- .2 Submit duplicate 100 x 100 mm samples of finish coating applied to hardboard.

1.5 QUALIFICATIONS

- .1 Coating: applied by applicator trained and licensed by coating manufacturer for application of its products.
- .2 Manufacturer's representative:
 - .1 Inspect substrate prior to commencement of work, during application of coating and upon completion of work.
 - .2 Provide technical assistance to applicator and assist where required in correct installation of membrane.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Do not apply unless uniform minimum 16°C air temperature at installation area for 24 hours prior to and after application.

- .2 Provide adequate ventilation or isolation measures to protect against toxic fumes.

1.7 MAINTENANCE DATA

- .1 Provide maintenance data for coatings for incorporation into manual specified in Section 01 11 01

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Ensure compatibility for all epoxy materials including primers, resins, hardening agents, finish coats and sealer coats.
- .2 All epoxy materials from same manufacturer.
- .3 Interior epoxy floor coating system: chemical resistance when tested to ASTM D1308-02(2007), Sulfuric Acid (50%): No affect at 5 days.
 - .1 Primer: as recommended by manufacturer.
 - .2 Floor base coat: 2 part epoxy, 100% solids, colour and texture selected by Departmental Representative.
 - .1 Tensile strength: to ASTM D638-10, minimum 34 MPa.
 - .2 Compressive strength: to ASTM C579-01(2006), 100 MPa.
 - .3 Flexural strength: to ASTM D790-[10], minimum 36 MPa.
 - .4 Hardness: to ASTM D2240-05, 82 (Shore D).
 - .5 Water absorption: to ASTM D570-98(2010)e1, <0.20%.
 - .6 Abrasion resistance: to ASTM D1044-08, 0.070 g (1000 revolutions) or ASTM D4060-[10], CS17 wheels @1,000 g, 0.062 g loss.
 - .7 Acceptable material: 'Selbachem' manufactured by Harris Specialty Chemicals, (905) 639-1691 and 'Caphard HPC' manufactured by Cappar Limited, (905) 453-5280.
 - .3 Floor top coat: 2 part epoxy, 100% solids, colour selected by Departmental representative.
- .4 Aggregate: silica sand to epoxy coating manufacturer's requirements.

2.2 MIXES

- .1 Mix coatings according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 PREPARATION OF SURFACES

- .1 Prepare surfaces in accordance with epoxy coating manufacturer's instructions. Remove all existing coatings, surface laitance and other contaminants.
- .2 Mask surrounding surfaces to provide neat, clean juncture lines.
- .3 Protect adjacent surfaces and equipment from damage by overspray.
- .4 Work penetrating substrate to be completed before installing coating.
- .5 Floors: fill surface irregularities, bug holes, cracks with epoxy mortar recommended by epoxy floor coating manufacturer.

3.2 FLOOR COATING APPLICATION

- .1 Apply primer to porous surfaces in accordance with epoxy coating manufacturer's instructions.
- .2 Apply floor coating in two coats. Total dry film thickness 3 mm.
- .3 Broadcast sharp silica sand onto top coat of high build coating while it is still wet.
- .4 Form 100 mm high coved base.

END OF SECTION

1. General

1.1 Summary

- .1 Work of this Section includes the fabrication and installation of four cold rooms and the retrofit of one growth chamber. The scope of work includes the design and construction services to meet the specifications contained herein. Since the project is a design and build format, the room supplier shall be responsible for the complete design and turn key operation for the rooms. The rooms must follow the CFIA - PPC-2 level guidelines for containment control.
- .2 The location and type of room is shown on the drawings. Provide the following types of rooms:
 - .1 Room 164a - walk-in cold room
 - .2 Room 164b - walk-in cold room
 - .3 Room 156a - walk-in cold room
 - .4 Room 156b - walk-in growth room
 - .5 Room 1087- walk-in cold room

1.2 RELATED SECTIONS

- .1 Mechanical: Division 21-23 Mechanical
- .2 Electrical: Division 26 Electrical

1.3 REFERENCES

- .1 ASTM
 - .1 ASTM A 167, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
 - .2 ASTM A 653M-01, Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process (metric).
 - .3 ASTM B88-99, Specification for Seamless Copper Water, Tube.
 - .4 ASTM B 280 -99 Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service

- .5 ASTM E 84, Test Method for Surface Burning Characteristics of Building Materials.
- .6 ASTM E 162, Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB - 52.28 -M87 Refrigerators and Freezers, Prefabricated , Mechanical, Commercial, Walk-in
 - .2 CAN/CGSB -19-M87 Sealing Compound, One Component, Elastomeric, Chemical Curing
 - .3 CGSB 51-GP-23M-78, Thermal Insulation, Urethane, Spray in Place.
- .3 ANSI/ASME/ASHRAE/CSA
 - .1 ANSI/ASME B16.26-1986 Fittings Flanges and Valves
 - .2 ANSI/ASME B16.29-1986 Fittings Flanges and Valves
 - .3 ASHRAE 15-2010, "Safety Code for Mechanical Refrigeration"
 - .4 ASHRAE 34-2010, "Number Designation of Refrigerants"
 - .5 ASHRAE 62-2010, "Ventilation for Acceptable Indoor Air Quality"
 - .6 CSA B52-95, "Mechanical Refrigeration Code"
 - .7 CAN4 -S101-M82 Fire Endurance Tests of Building Construction and Materials
 - .8 CAN/ULC -S102 , Surface Burning Characteristics of Building Materials and Assemblies

1.4 SYSTEM DESCRIPTION

- .1 Performance Requirements:
 - .1 All rooms are constructed of pre-molded, modular insulated panels. Each panel shall have dimensions to allow passage through normal doorways. Construction of panels shall allow for future expansion and easy disassembly for relocation. Room shall be complete with necessary controls, circulation systems and mechanical and electrical equipment to meet these specifications.
- .2 Control and Performance of Growth Chamber:
 - .1 Room 156b - Growth Chamber - 3048mmX 3048mm X 2438 high - supply and install a new insulated room shell and refurbish with the existing controls and lights to the new room. Existing growth room performance is

established from the existing control system. The entire control panel and light fixtures shall be relocated to the new shell. Remove and relocate existing condensing unit to the new location and reinstall the complete system. Install a new ST600 steam humidifier as described in Section 2.4. Installation of door security system and integration into existing Chubb system is to be carried as part of a Cash Allowance. See Division 1 specifications.

- .3 Control and Performance for each new room:
 - .1 Temperature Range: +4°C +/- 2.0°C adjustable to 15°C. Humidity control to be additive up to 80% RH +/- 10% adjustable between 60%-90% RH at +4°C.
 - .1 Room 164a - 3048mmX 3048mm X 2438 high
 - .2 Room 164b - 3048mmX 3048mm X 2438 high
 - .3 Room 156a - 3048mmX 3048mm X 2438 high
 - .4 Room 1087- 3048mmX 3048mm X 2438 high
 - .2 Digital temperature display for both set point and actual conditions. Recording of room temperature and humidity embedded in the digital controller. Adjustable out of limit alarm system for both temperature and humidity with dry contacts. Provision for remote alarms to the building automation system by the Owner.
 - .3 Design conditions outside of rooms: 23° C dry bulb max. and 18 °C max. wet bulb.
 - .4 Number of door openings per 24 hours: twice per hour.
 - .5 Average duration for each door opening and closing: 20 seconds.
 - .6 Product load - assume product to be at design conditions when entering the space as per 1.4.3.3 of this Section.
 - .7 Allow in load calculation additional load of 20 Watts per square meter.
 - .8 Provide an overall safety factor on loads and equipment selection of 20%.
 - .9 Lighting levels from T5 fixtures in the room to 60 foot candles at 1220 mm above finished floor level.
 - .10 Install trim kits to fit the room to the adjacent architectural finishes.
 - .11 Interior shelving by client.

- .12 Floor topping and concrete curbs - Closely coordinated with room supplier.
- .13 Provide door locks embedded in the door and frame by this division. Terminate all wiring to the top of the room for final connection by others.
- .4 Mechanical Systems:
 - .1 Pre-packaged evaporator and condensing unit built into one common refrigeration unit that shall be water cooled operating on refrigerant R404a. The evaporator and fan motors are contained within the common unit and directly connected to the condensing unit. Complete package to be mounted directly on the top of the room with no evaporators and fans in the room. Contains built in drain pan with a trap and fitting for condensate line connection by others. Complete unit is secured to the top of the room with a gasket kit ensuring a completely hermetic seal to the room shell to maintain the integrity of each room to the ambient to meet PPC-2 containment level requirements. Pre-packaged refrigeration complete with sound kit for noise attenuation. Room 1087 shall use the remote evaporator and condensing unit option for the LT01500 pre-packaged system.
 - .2 The compressor and condenser is built into the packaged refrigeration system. Process cooling water provided by Division 22.
 - .3 Provide steam humidifier nozzle for direct injection into the pre-packaged refrigeration system. The humidifier shall operate on reverse osmosis water. Humidifier is complete with overflow and independent emergency drain pan. Modulating clean steam output controlled by humidity control channel in the controller.
 - .4 Condensate from humidifier and refrigeration coil to be connected by Division 23.
 - .5 Service access to pre-packaged refrigeration system, cooling coils, fan motors and humidifier from the top of the box. Provide local electrical disconnects for the refrigeration system and humidifier.
 - .6 Provide removable 4" acoustical panel enclosure with perforated interior around relocated condensing unit from room 1087.

- .7 Noise levels as measured from 3 feet in front of each cold room/growth room must not exceed NC 45 sound levels.
- .5 Electrical Systems:
 - .1 Electrical power: Supply voltage of 208V/3Ph/60Hz as shown on electrical drawings. General Contractor to provide one 30 A power feed to each room control panel. All wiring downstream from the panel is included in this section to lights, pre-packaged refrigeration system, controls, humidifier and door heaters.
- .6 Support service:
 - .1 Type required: Standard response - within 4 hours. Cold room supplier to demonstrate local service response capability.
- .7 Dimensions stated as all external and refer to the architectural drawings for exact locations and dimensions. All final dimensions are subject to field measurements by the room manufacturer and a dimensional tolerance of +/- 10% based on floor area will not result in a change in price to the Owner.
- .8 Lab Benches, Shelving and Equipment
 - .1 Others will provide all casework, shelving and equipment in the room.
- 1.5 SUBMITTALS
 - .1 Provide submittals in accordance with requirements of Division 1.
 - .2 Manufacturer shall submit complete design information to the Consultant for all cold and growth rooms. This information shall include cooling equipment sizes, equipment capacities and air delivery systems relative to system load including safety factor.
 - .3 Manufacturer shall submit a listing of at least 3 cold room installations that are similar to this installation and have been completed in the last five years. Reference must demonstrate conformance to these specifications.
 - .4 Shop Drawings:

- .1 Identify each cold room by Room Number and Item Number as shown on the drawings.
- .2 Indicate installation details, and panel identification corresponding to system for numbering panels for erection. Drawings submitted must be those actually used by field personnel for erection of insulated rooms.
- .3 Indicate features of units including but not limited to the following: switches, locks, doors, light fixtures, shelving, services, door locks, utility connection points, signage, and closure trim. Items shall be dimensioned for both size and location. Shop drawings shall note work provided by others. Coordinate services with mechanical, electrical, and other trade subcontractors.
- .4 Drawing submission shall include cover sheet, plan view of room and equipment, elevation view with equipment, electrical power and control drawings and equipment list. All shop drawings shall be sealed by a registered Ontario Professional Engineer immediately employed by the room supplier.
- .5 Samples: Submit one sample of panel interior and exterior finish when requested by the Owner's representative.
- .6 Operation and Maintenance Data: Provide operation and maintenance data for incorporation into manual specified in Division 1.
- .7 Testing Plan: All refrigeration systems and control panels are to be pre-tested in the factory prior to the field installation. Copies of test results must be submitted prior to on site fabrication. Submit testing plan to demonstrate how testing will accurately record unit's ability to comply with specified temperature range and uniformity. Submit test results from the factory test indicating how the systems operated for the intended operational parameters outlined in Section 1.3.1 and 1.3.2. Test out of limit alarms function as designed and demonstrate the acknowledgement of alarms and operation of dry contact outputs.
- .8 Provide cut sheet of selected high efficiency T-5 vapour proof lighting fixtures that will be used for the project.

- .9 Upon completion of the project, submit as built drawings in the operation and maintenance manuals specified in Section 01 11 01 - General Instructions Minor Works.

1.6 QUALITY ASSURANCE

- .1 Equipment manufacturer and installer: the company must have personnel skilled in the manufacturing and installing of prefabricated rooms and having continuous proven experience within last five years. Must be able to demonstrate local warranty and service support. Room supplier must prove that it has a valid Certificate of Authorization with Professional Engineers Ontario.

1.7 DELIVERY AND STORAGE

- .1 Deliver, store and handle materials in manner to prevent damage and deterioration. Protect all factory finished panel surfaces subject to damage while in transit and after installation.
- .2 Do not deliver materials or assemblies to site until installation spaces are ready to receive rooms. Cover and protect panels as required to prevent site damage.

1.8 SITE CONDITIONS

- .1 Examine and verify project conditions at site to assure acceptable access, dimensions, and general conditions. Notify Consultant in writing of any conditions which are unacceptable to the installation of these rooms. Determine exact room size by verifying the actual field measurements. Any errors in room selection shall be the responsibility of the room contractor.

1.9 SEQUENCING AND SCHEDULING

- .1 Install and complete rooms in close coordination with the work of other trades. Shop drawings must clearly communicate scopes of work by others.

1.10 WARRANTY

- .1 Manufacturer shall provide written warranty to the end user stating the product is free from defects in material or workmanship under normal use and service. Warranty shall become effective on the date of Interim Completion as

certified by the Consultant. The warranty shall cover the following items for the noted duration:

- .1 Ten year insulated panel warranty.
 - .2 One year parts and labour warranty on all components.
 - .3 Additional two year compressor parts only warranty on the new refrigeration system compressors only from the date of commissioning.
 - .4 Service and warranty to be provided directly by the room manufacturer.
- .2 Warranty will specifically provide in written form that one year after acceptance, the cold room will, under normal operation:
- .1 Maintain within specified tolerance the selected temperature settings.
 - .2 Be free from defects due to faulty materials or workmanship.
 - .3 Systems are to be maintained on regular basis including during the warranty period by the owner or the room supplier.

2. Products

2.1 MATERIALS

- .1 Stainless steel sheet: to ASTM A167, type 304 with No. 4 finish where required.
- .2 Galvanized steel sheet: commercial grade to ASTM A653M, with zinc coating (galvanized) to ASTM A6535M designation Z275 where required.
- .3 Mild steel sheet: Cold rolled to SAE 1010 to 1020 suitability prepared for specific finish.
- .4 Sealant: to CAN/CGSB-19.13 colour to match panel.
- .5 Isolating coating: mildew resistant to manufacturer's recommendations and approved by Health Departments having jurisdiction.
- .6 Panel finish: Powder coat, colour white on all embossed exposed surfaces.

- .7 Insulation for all panels: to CGSB-51-GP-23M, Class 3, foamed-in-place polyurethane using chlorine free blowing agent. Certified to have a flame spread rating or 25 or less, and passed one or more of following standard test methods for Fire Hazard Classification of Building Materials:

- .1 CAN4-S101, CAN/ULC-S102 and be labelled by ULC

2.2 FABRICATION

- .1 Manufacture: to CAN/CGSB 52.28 and CSA B52-M1991.
- .2 Overall dimensions:
 - .1 Cold Rooms and Growth Room - as indicated but subject to final field measurements to maximum "best fit" dimensions. Coordinate with architectural dimensions and construction details for lab benching and shelving when required.
- .3 Wall and ceiling panel sections: 75 mm thick, precision die formed metal pans accurately spaced and insulated. Panel edges and corners to have tongue and grooves, formed-in-place, to assure airtight, vapour proof joints using epoxy base caulking. Do not use structural metal, wood or fiberglass material between interior and exterior skins. White embossed pre-painted steel. Mate panels to custom concrete curbs with a hidden screed to secure panels to the top edge. Provide empty conduits terminating at the top of the box for electrical connections, door locks, room sensors and other electrical and electronic devices in the room. Externally mounted conduits in the room will not be accepted. Seal all conduits at the outer connection at the top of the box for moisture control and contamination control. Panels systems designed for light duty washing and disinfecting. All joints must be sealed with a clean bead of sealant to prevent direct water penetration.
- .4 Corner panels: 300 x 300 mm wide externally, preformed 90° angles.
- .5 Swing type door: insulated and finished same as exterior and interior panels with 1066 mm x 1980 mm clear door opening, reinforced to prevent door panels from twisting, racking or warping. Ensure doors will close and seal opening. Equip each door panel with:
 - .1 Infitting flush mounted type, door (swing as indicated by drawings) to fit door opening, insulated and

finished same as panels, soft thermoplastic gasket with magnetic steel core at top and both sides, adjustable rubber wiper gasket at bottom. Gaskets to be oil, fat, water and sunlight resistant and be replaceable.

- .2 Heated door gaskets to prevent condensation. Automatically temperature controlled to engage at +8 °C and below. Disengage at 9 °C and above.
- .3 Hinges: ramped hinge, self-closing type, with stainless steel pin and nylon cam-type bearing, cast aluminum and polished finish.
- .4 Latch: to match hinges, for opening door by breaking force of trigger-action door closer and magnetic gasket. Latch to be capable of being locked with padlock and have inside safety release handle capable of opening door from within even when the door is padlocked or key locked from the outside.
- .5 Light switch to be factory pre-wired, and terminating in vapour-tight junction box on the outside door jamb. Light switch wiring is terminated in an electrical junction box mounted on the inside of the room directly above the interior door frame. Ceiling mounted lighting fixtures in the room are wired to the pre-fabricated junction box and switch. Conduits are sealed to maintain vapour tight installation to limit condensation.
- .6 Thermostatically controlled door and window heaters designed to operate automatically. Provide a thermostat to automatically engage all heaters at 8 °C and below and cut out at 9 °C and above to prevent overheating.
- .7 Provide factory installed pressure relief vents to automatically adjust for changes in room air density relative to the ambient air. The relief vents shall allow air to pass through the vent in both directions and where required, include a heater where required to prevent condensation from forming or interfering with the heater vent action. Wiring is concealed in the wall panels and thermostatically controlled by temperature controller in the room to prevent door heater operation at warm room temperatures. Provide cover box with 80 mesh screen to maintain contamination room seal.
- .8 Factory installed kickplates on the interior and exterior of the doors constructed of 18 gauge 304

stainless steel with #4 finish fastened to the door with mechanical fasteners. Kickplates are the full width of the door and a minimum of 1016 mm high in and out.

- .9 Provide a door ajar alarm that will automatically alarm if the door is left open for a period that is user defined with an adjustable timer. Conceal the door ajar proximity switch in the door frame and door edge without the use of external wires or visible connectors.
- .10 Where the room is placed on a concrete curb and screed, manufacture the door length with a double wiper sweep gasket and fabricate the door and gaskets to account for the additional required door length. Maintain a high quality door seal.
- .11 Installation of door security system and integration into existing Chubb system is to be carried as part of a Cash Allowance. See Division 1 specifications. Door hardware should consist of 24 volt latch and strike with a card reader system integrated into the door frame and door panel. Provide concealed conduit in the cooler panel construction. Install the electronics in the local control panel provided as part of this section. Ensure the door provides an emergency egress system as part of the door.
- .12 Provide one hydraulic door closure device per door to provide a positive soft door closure and locate on the exterior of the door frame.
- .16 Ceiling panels: reinforced internally or externally as required to support the weight of the ceiling panels and refrigeration systems, lights and service/maintenance personnel with their tools. Where external reinforcement is needed and through-fasteners used, fasteners to be of low heat conducting material such as Teflon. Insert fasteners in Teflon sleeves to prevent compressing of insulation. Cover all exposed rods and nuts with a decorative panel material to match the ceiling panels to conceal the fasteners.
- .17 Maximum deflection of ceiling panels shall not exceed $L/240$ of the span under a loading of 20 pounds per square foot. If the ceiling spans require a support system, the Contractor shall submit details and

structural calculations demonstrating conformance with specified requirements.

- .18 Panel thickness and finishes for exterior and interior panels exposed to normal view except floor panels: minimum 24 gauge aluminum skin, with factory white painted powder coat finish and embossed on the exterior and interior to match existing room finish.
- .19 The room manufacturer shall manufacture the wall panels true and square. Provide a hidden screed to create a blind securing system on top of the concrete flooring system and curb. The floor system shall be sloped to an internal concrete formed pit. Refer to drawings for pit dimensions, the pit will include a 304 stainless removable grate designed with vertical reinforcements. The concrete floor around the pit shall drain toward the pit to capture the post cleaning fluids. The complete room perimeter will be equipped with a leveling curb to ensure the wall panels will sit flush to the floor. The curb will include a chamfer 25mm wider than the wall panels on each side to ensure wash down procedures will allow the fluids to run off the wall on to the floor without pooling. The height of the curb shall 155mm. The wall panel system will utilize a hidden screed to ensure the wall panels mate to the curb creating a cleanable wall panel system without trapping water in between the panel and the top of the curb. The concrete will be sealed post curing with an epoxy coating on the curb and floor and concrete pit providing an integral seal.
- .20 Locking devices: panel sections to have cam-action locking devices, spaced at maximum 950 mm vertically, 600 mm horizontally. Male and female lock pockets to secure panels foamed into the wall panels at the point of manufacturing.
- .21 Accessories:
 - .1 Lighting: vapour-proof, 120V, fluorescent fixtures equipped with high output, cool white, 1220 mm T5 bulbs and low temperature ballasts. Light fixtures shall be UL listed. Housing constructed of corrosion-resistant fiberglass or ABS plastic, complete with clear prismatic acrylic lens with closed cell neoprene gasketing

bonded to housing to form continuous seal for the lens. Lighting of sufficient quantity and intensity to provide a minimum of 60 foot candles at 1220 mm above the floor. Space the fixtures to create a uniform distribution of light. Connect to the light switch and pilot light on room exterior at the entrance door.

- .2 Closure strips: provide metal vertical closure strips to enclose opening between cold rooms and adjacent walls. Finish of closure strips to match exposed exterior finish of room panels. Horizontal metal filler strips over 4" in height to be provided by others. Attach with sealant as specified and use no screws.

2.3 CONTROL PANEL AND INSTRUMENTATION

.1 Control panel:

- .1 Each control panel, incorporating lockable access doors to house the combination temperature and humidity controller and relays for the system operation. Provide a keyed switch in the door panel for secured access to the stop and start switch. Panel contains following:

- .1 Temperature and Humidity Controller: Microprocessor based PID controller designed specifically for cold room applications with the following universal features:
- .2 Inputs: Dual analog inputs, 2 digital inputs, 2 - PT100 inputs or 2-20mA inputs or Class A PT100 sensors.
- .3 Failsafe input capability.

- .2 Microprocessor PID controller with tuning loop shall continuously monitor room condition versus setpoint, providing an output that will modify the conditioning system capacity in response to any deviation.

- .2 User programmable keys allowing simple program changes. LCD display of alpha numeric characters.
- .3 Non-volatile memory backup.

- .4 Embedded program functions: Each controller for the rooms shall be programmed to be universally adaptable for any application and shall include the following program functions in each single controller. All functions accessed through the controller:
 - .1 Temperature control: setpoint and process variable. High and low temperature alarms with simple set point change through the touch pad.
 - .2 Humidity control: setpoint and process variable. High and low humidity alarms with simple set point change through the touch pad.
 - .3 Lighting control: Provide On/Off control for task lighting in each cold room. Control for growth room to be consistent with existing system configuration.
 - .4 Door ajar alarm with automatic timer to acknowledge failed door closure. Programmable door time period user defined.
 - .5 Two programmable alarms. Low and high temperature and low and high humidity. Silence button with automatic reset after a timed duration. Programmable duration defined by user.
 - .6 Password protection: using four alphanumeric combinations.
 - .7 Alarm silence: fully adjustable time delay with resolution of 1 min up to 100 hours and automatic reset.
 - .8 Provide dry contacts for high and low alarms for remote connection by others.
- .3 Conduits, wires and connections to control panel shall be concealed by control panel or accessory panels. Exposed conduits and wires are not permitted.
- .4 Control panels pre-wired and tested. Panels shall include Electrical Safety Authority certificate for use in Canada.
- .5 All wiring to be concealed in panduit and all circuit breakers, relays and electrical devices to be rail mounted.
- .6 Control panel shall contain all DIN rail mounted circuit breakers for the refrigeration unit and heating module, lights, control panel control circuit, spares and built in

wall mounted GFI receptacles. All wiring shall be concealed in panduit with cover. Maintain separate sources of power and control wiring.

Control panel shall measure no more than 510mm wide, 765mm high and 200mm deep. Baked white paint over steel to match the white room panel finish. Control panel is to be located on the front of the room as per Drawings.

2.4 REFRIGERATION EQUIPMENT

- .1 Refrigeration equipment: Designed and manufactured to be of adequate capacity to fulfill individual room operating temperature and performance. The equipment selection and sizing shall be the responsibility of the room supplier. The supplier must provide evidence of all cooling or heating loads and equipment selections to the base building engineers. Loads shall be certified by a registered Professional Engineer. The units must be specifically designed to meet CFIA PPC-2 operation.
- .2 Pre-packaged conditioning system requirements:
 - .1 Provide a pre-packaged refrigeration system capable of providing universal control over the full range of +4°C to +15°C with a simple setpoint change at the primary room controller.
 - .2 Complete unit shall be indoor water-cooled complete with hermetic or semi-hermetic compressor, automatic adjustable high and low pressure controls, adjustable water regulating valve for use with process water, liquid receiver with 120% system capacity, suction accumulator, crankcase pressure regulator, drier and sight glass mounted on common base with isolation for the compressor. Compressors shall be furnished to operate on 208/230V, 3 phase service. Provide rubber isolation on the compressor to minimize noise transmission. Provide electrical disconnect switch. Provide liquid line, hot gas line and suction lines and insulate where required. System to be designed with chlorine free R404a refrigerant. System breaker in the local control panel and local non fused disconnect on the pre-packaged unit. Condenser shall be adequately sized to provide operation with condenser water entering at +5°C up to +28°C. Unit must be fully capable of cooling or heating in the full range of +4°C to +15°C using only the refrigeration

cycle and without the use of additional electric heating elements.

- .3 Pre-packaged unit shall contain one evaporator with: dual fans, forced-convection, packaged unit type, installed in the packaged evaporator system with an integral drain pan and remote drain fitting. Provide an adjustable expansion thermostatic expansion valve, with strainer, hot gas inlet tee and be externally equalized. Air circulation motors: lifetime sealed, ball bearings and shall be designed to operate up to +45°C room temperature and rated for 208/230V single-phase service. Entire evaporator assembly must be readily accessible for cleaning and non-metallic shell encapsulating the evaporator housing to resist corrosion. Provide electronic liquid line and hot gas modulating valves designed for full 0% to 100% modulation. The entire evaporator shell shall be accessible by releasing the stainless steel housing straps and cam action clips. The evaporator shall be external to the room, with all airflow internal to the evaporator and sealed from ambient. All airflow must be filtered with an 80 mesh screen to adhere to PPC-2 contamination guidelines.
- .4 The entire pre-packaged conditioning system is external to the room and resides on top of the room shell for service access. The heating must be accomplished with hot gas bypass and electric reheat systems are not acceptable. Entire evaporator enclosure is non-ferrous and must resist multiple cleanings and disinfections.
- .5 The refrigeration compartment shall include a sound attenuation package to contain compressor noise within and around the compressor base and control valves.
- .6 Cooling coil is chemically treated to resist corrosion. Apply a 25 micron layer of UV and impact resistant treatment resulting in a heat transfer coefficient of 99% of an untreated coil. Coil treatment must be pre-approved to have met the ASTM Salt Spray test B117 and Acid Spray Test ASTM G85 for no less than 3,000 hours. Coils shall be dipped and totally covered in coating including end bends. Spray applications are not acceptable.

Room 1087 shall use the same pre-packaged system with the remote condenser option. The evaporator system is exactly the same as the pre-packaged model LT01500 but the condenser, receiver, high and low pressure

controls and compressor are mounted on a remote base from the evaporator and piped between the evaporator and the condensing unit. The condensing unit shall be indoor water-cooled complete with hermetic or semi-hermetic compressor, automatic adjustable high and low pressure controls, adjustable water regulating valve, liquid receiver with 120% system capacity, suction accumulator, crankcase pressure regulator, drier and sight glass mounted on common base with isolation for the compressor. Compressors shall be furnished to operate on 208/230V, 3 phase service. Provide rubber isolation on the compressor to minimize noise transmission. Provide electrical disconnect switch. Provide liquid line, hot gas line and suction lines and insulate where required. System to be designed with chlorine free R404a refrigerant. System breaker in the local control panel and local non fused disconnect on the pre-packaged unit. Condenser shall be adequately sized to provide operation with condenser water entering at +5°C up to +28°C. Unit must be fully capable of cooling or heating in the full range of +4°C to +15°C using only the refrigeration cycle and without the use of additional electric heating elements. Condensate piping to drain by Division 22.

- .7 Systems controlled by the temperature control system as listed in 2.4 Control Panel and Instrumentation.
 - .8 Room supplier must provide supporting documentation at time of bidding to demonstrate conformance to the equipment specified in this document. These units must meet the CFIA PPC-2 containment requirements.
- .3 Pre-packaged steam generator for use with pre-packaged conditioning system:
- .1 Provide ST600 pre-packaged steam humidifier capable of injecting clean steam into the evaporator and air side system of the pre-packaged cooling and heating unit.
 - .2 Supply a self-contained, microprocessor controlled ceiling mounted steam humidifier. Steam shall be generated by 800/825 incoloy electric heating immersion elements. Maximum capacities shall vary between 2.7 and 3.6 kg/hr. The humidifier shall operate with reverse osmosis water.
 - 1. For safe operation, the humidifier must have both a bi-metal temperature sensor sensing the temperature of the stainless steel evaporation

tank next to the heating elements and also an internal stainless level float assembly that will sense a low water level condition. Both devices shall interrupt the control circuit and steam output.

2. For safety and security reasons, all components, electrical wiring will not be exposed and must be contained within the adjacent electrical cabinet of the unit. The humidifier shall have evaporation tank, supply and overflow drain trap.
3. The humidifier shell shall be constructed of 16-gauge 304 stainless steel with a 2B finish and welded seams.
4. The humidifier shall be accessible with a removable lid held in place with bolts and a compressible EPDM gasket material.
5. The humidifier shall have an overflow drain pan manufactured of 304 stainless steel 18 gauge and welded seams with a drain fitting. It shall fit under the complete humidifier and provide complete coverage under the humidifier. Piping to drain by Division 22.
6. The evaporation container shall have a safety overflow connection and a drain port, which will be located on the side wall of the evaporation tank.
7. The supply water to the unit shall be controlled by the adjustable stainless steel float.
8. The humidifier heating elements will be controlled via the solid state relays located in the control panel and the microprocessor controller shall modulate the steam output to control the room space conditions. The humidifier shall be capable of modulating from 0 to 100% of the total steam output capacity.
9. The steam humidifier shall include a distribution nozzle connection measuring 1.25 inches for connection to a high temperature braided hose and a steam distribution wand.
10. Safety controls at the point of steam distribution in the system shall include a high limit humidistat or pressure differential switch or fan current switch. This shall be included as part of the safety circuit.
11. The unit shall be ESA or CSA certified.
12. The unit shall draw approximately 9 FLA at 208/230 volts single phase and 60 cycle.

.2 System controlled by the temperature control system as listed in 2.4 Control Panel and Instrumentation.

- .4 Refrigerant tubing and insulation: All refrigeration piping shall be designed in accordance with the latest ASHRAE standards for the appropriate refrigerant used. This will be full responsibility of the system designer of this section. The cold room manufacturer shall be responsible for the complete design and successful operation of all systems and meet the performance and warranty obligations contained herein.

2.5 SERVICES

- .1 Coordinate design of rooms to accommodate local field services provided by Division 21-23 and 26. Provide reinforcement for wall penetrations as recommended by wall system manufacturer. Other trades shall be responsible to seal their own penetrations.
- .2 Electrical wiring and components shall meet CSA standards.
- .3 Division 26 shall provide a single point of connection to the control panel terminal blocks with a fused disconnect switch. The cold room manufacturer shall provide all field wiring their equipment from the control panel and feed all room components.
- .4 Division 22 shall provide a single point of connection to the water cooled condenser regulating valve including isolation valves and insulation as required. Regulating valve provided by the room manufacturer.

3. Execution

3.1 EXAMINATION

- .1 Examine and verify areas and work of other trades for conditions that affect the work of this section.
- .2 Report unsatisfactory conditions to Consultant in writing.
- .3 Do not begin installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- .1 Installation shall be performed by manufacturer's personnel or manufacturer's representative. Manufacturer shall supply factory trained, on-site supervision at all times when work of this section is performed.
- .2 Provide appropriate protection apparatus.
- .3 Install in accordance with CAN/CGSB 52.28.
- .4 Erect work true-to-line, plumb, square and level with all joints aligned. Fit joints and intersecting members accurately and in true planes adequately fastened.
- .5 Insulate to prevent electrolysis between metal and concrete by applying coating of asphaltic paint to metal surface, applied in accordance with manufacturer's instructions. Insulation to be dry before assembling floor panels in place.
- .6 Unless otherwise indicated, install units within 25 mm of building walls. Fasten screeds to building and/or wearing floor in accordance with manufacturer's instructions.
- .7 Cut or drill holes in panels, as required, to accommodate electrical and mechanical services, runs or connections. After installation of services, fill remaining space with insulation and seal.
- .8 Cap wrench access holes with an in-fitting, flush, vinyl removable plug.
- .9 Install removable closure panels, vertical cover strips, and angles.
- .10 Supervise installation of thresholds, heaters and urethane insulation for floors.
- .11 Final connections of building utilities to room will be made by plumbing, and electrical contractors.

3.3 CLEANING AND ADJUSTING

- .1 Upon completion of work, clean equipment and apparatus, remove protective coverings and test and adjust operating equipment. Re-finish damaged coatings and finishes.

3.4 VENDOR CONFORMANCE TESTING

- .1 Manufacturer shall construct one room on their own premises that will demonstrate conformance to these specifications. The model numbers and equipment must match the description in these specifications. The room shall be designed to create fully functional cold room and shall demonstrate how the system conforms to these operational design features contained in these specifications. This shall be done at no extra cost to the client. The vendor must construct a fully working system and demonstrate to the client's user group and appointed consultants that the systems perform as described below.
- .2 The factory test and demonstration shall include the following:
 - .1 Run test of 72 hours at desired setpoint of 4 ° C +/- 2°C. Provide proof of operation with a 12 point data logger to demonstrate performance. Run test of 8 hours at desired setpoint of 4 ° C and 80% RH +/- 10%. Provide proof of operation with a 12 point data logger to demonstrate performance and single point conformance test for humidity. All data loggers shall be calibrated devices.
 - .2 Provide live evidence that the air flow and moisture collection system conforms to this specification. Demonstrate the integrity of the contamination containment meets these specifications on the air side system.
 - .3 Demonstrate the operation of the control system for temperature and humidity setpoints and alarms, door ajar alarm functions, lighting program functions, door panic alarm functions according the requirements of this specification.
 - .4 Demonstrate the ability to record the process temperature and humidity and simulated alarms in the control panel. .
 - .5 Owner and Consultants will be notified 10 business days in advance when the live demonstration tests will be scheduled. Manufacturer shall provide an agenda and outline of the testing program and witness testing prior to arrival at the vendors place of business. Video tape the results of the testing and document success prior to commencing the project.
 - .6 A report shall be developed and filed within 5 business days from the completion of the witness test

and shall be authorized by a Professional Engineer representing and directly employed by the vendor.

- .7 Should the systems fail this test, then it will be the full responsibility of the room manufacturer to correct the system design and resubmit for a new test to the owner prior to installation.
- .8 Release for construction approval must be obtained by the vendor from the client prior to proceeding with site construction.

3.5 SITE TESTING AND TRAINING

- .1 Manufacturer shall provide final site test results for the complete refrigeration and humidifier system operation prior to requesting acceptance from the client or owner. The site test shall include a 4 hour run test of the complete system following the outline of factory testing as described in Section 3.4 of this specification.
- .2 Manufacturer shall instruct Owner in the complete operation of room, including controls, after completion of room start-up.
 - .1 Provide 4 hours of demonstration and instruction on each type of unit furnished, using manufacturer's representative.
 - .2 Provide Operation and Maintenance data indicating sequential operation, start-up and shut-down, and preventative maintenance, with all pertinent control data, schematics, test results, quality control documents and as built drawings

END OF SECTION



AAFC LONDON
COLD / GROWTH ROOM PROJECT
NUMBER -

CHORLEY + BISSET LTD
CONSULTING ENGINEERS
LONDON ONTARIO

FILE NO. 7259
December 19, 2013

<u>Number</u>	<u>Title</u>	<u>No. of Pages</u>
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GENERAL REQUIREMENTS SUBGROUP

Division 00-01

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PART 1 - GENERAL

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 01 - General Instructions Minor Works.
- .2 Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in Ontario.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .4 Shop drawings and product data accompanied by:
 - .1 Certification of compliance to applicable codes.
- .5 In addition to transmittal letter referred to in Section 01 11 01 - General Instructions Minor Works: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .6 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 11 01 - General Instructions Minor Works.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Consultant before final inspection.
 - .3 Operation data to include:
 - .1 Description of systems and their controls.
 - .2 Operation instruction for systems and components.
 - .3 Description of actions to be taken in event of equipment failure.
 - .4 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.
 - .5 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
 - .6 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Consultant for approval.
 - .2 Make changes as required and re-submit as directed by Consultant.
- .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual

additional data when need for it becomes apparent during specified demonstrations and instructions.

- .8 Site records:
 - .1 Consultant will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .9 As-Built Drawings:
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Consultant for approval and make corrections as directed.
 - .4 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 11 01 - General Instructions Minor Works.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 MAINTENANCE

- .1 Furnish spare parts in accordance with Section 01 11 01 - General Instructions Minor Works as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 11 01 - General Instructions Minor Works.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste

materials for reuse and recycling in accordance with Section 01 11 01 -
General Instructions Minor Works.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Not Used.

PART 3 - EXECUTION

3.1 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.2 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.
- .2 Separate dissimilar metals by means of gaskets or shims of approved material or use dielectric unions or flanges in order to prevent electrolytic action. Where piping of dissimilar metals is connected, use approved dielectric unions or couplings. A brass fitting or brass valve may also be used in making connections between copper and steel piping.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Extend existing system to provide wet sprinkler coverage for new cold and growth rooms.

1.2 REFERENCES

- .1 American National Standards Institute/National Fire Prevention Association (ANSI/NFPA)
 - .1 ANSI/NFPA 13, Installation of Sprinkler Systems.
 - .3 ANSI/NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN4 S543-M984, Standard for Internal Lug Quick Connect Couplings for Fire Hose.

1.3 DESIGN REQUIREMENTS

- .1 Extend existing automatic wet pipe fire suppression sprinkler system in accordance with required and advisory provisions of NFPA 13 for uniform distribution of water over design area. Use hazard rating as per RMS guidelines.
- .2 Include with each system materials, accessories, and equipment to provide each system complete and ready for use.
- .3 Provide each sprinkler head to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment.
- .4 Locate sprinkler heads in consistent pattern with ceiling grid, lights, and air supply diffusers.
- .5 Devices and equipment for fire protection service: ULC approved for use in wet pipe sprinkler systems.
- .6 The Drawings show sprinkler types and locations and main piping layouts. Use this information as a basis to extend the existing sprinkler system which will completely protect the area related to the scope of this project. Coordinate the preparation of sprinkler Drawings

with all other trades to avoid conflict with other services.

- .7 This project involves extension of existing sprinkler system for new cold and growth rooms in the Header House.
- .8 The Fire Protection Engineer is to size all piping and indicate sprinkler head and pipe locations on working Drawings. Sprinkler head locations and quantities shown in the Bid Documents are for general layout purposes only, to identify approximate locations and quantities and sprinkler head types to be used. The Contractor is responsible for determining exact locations and quantities of sprinkler heads. The Contractor is responsible for determining exact locations for piping.
- .9 Provide sufficient number of sprinkler heads, whether shown on the drawings or not, to achieve coverage as required by NFPA 13 and RMS.
- .10 Prepare the Drawings in AutoCAD 2010. Show sprinkler heads on Architectural Reflected Ceiling Plans.
- .11 Use sprinkler heads suitable for the temperature of the environment (e.g. extremes of hot or cold).

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 11 01 - General Instruction Minor Works.
 - .1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 11 01 - General Instruction Minor Works.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 11 01 - General Instruction Minor Works.
 - .1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Ontario.
 - .2 Indicate:
 - .1 Materials.
 - .2 Finishes.
 - .3 Method of anchorage
 - .4 Number of anchors.
 - .5 Supports.
 - .6 Reinforcement.
 - .7 Assembly details.
 - .8 Accessories.
- .3 Quality assurance submittals: submit following in accordance with Section 01 11 01 - General Instruction Minor Works.

- .1 Test reports:
 - .1 Submit certified test reports for wet pipe fire protection sprinkler systems from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.
- .2 Manufacturer's Field Reports: manufacturer's field reports specified.
- .4 Closeout Submittals:
 - .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 11 01 - General Instruction Minor Works in accordance with ANSI/NFPA 20.
 - .2 Manufacturer's Catalog Data, including specific model, type, and size for:
 - .1 Pipe and fittings.
 - .2 Sprinkler heads.
 - .3 Pipe hangers and supports.
- .3 Drawings:
 - .1 Sprinkler heads and piping system layout.
 - .1 Prepare 760 mm by 1050 mm detail working drawings of system layout in accordance with NFPA 13, "Working Drawings (Plans)".
 - .2 Show data essential for proper installation of each system.
 - .3 Show details, plan view, elevations, and sections of systems supply and piping.
 - .2 Electrical wiring diagrams.
- .4 Field Test Reports:
 - .1 Preliminary tests on piping system.
- .5 Records:
 - .1 As-built drawings of each system.
 - .1 After completion, but before final acceptance, submit complete set of as-built drawings of each system for record purposes.
 - .2 Submit 760 mm by 1050 mm drawings on reproducible Mylar film with title block similar to full size contract drawings.
- .6 Operation and Maintenance Manuals:
 - .1 Provide maintenance data for incorporation into manual specified in Section 01 11 01 - General Instruction Minor Works.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in wet sprinkler systems with documented experience approved by manufacturer.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with

Section 01 35 29.06 - Health and Safety Requirements.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 11 01 - General Instruction Minor Works.
 - .2 Provide spare sprinklers and tools as required by ANSI/NFPA 13.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 11 01 - General Instruction Minor Works.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Protection:
 - .1 Store materials indoors in dry location.
 - .2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
- .3 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 11 01 - General Instruction Minor Works.

PART 2 - PRODUCTS

2.1 ABOVE GROUND PIPING SYSTEMS

- .1 Provide fittings for changes in direction of piping and for connections.
 - .1 Make changes in piping sizes through tapered reducing pipe fittings.

2.2 PIPE AND FITTINGS

- .1 Pipe:
 - .1 Ferrous: to ANSI/NFPA 13.
 - .2 Copper tube: to ANSI/NFPA 13.
 - .3 Plastic piping for underground installation: to ANSI and NFPA 13
- .2 Fittings and joints to ANSI/NFPA 13:

- .1 Ferrous: screwed, welded, flanged or roll grooved.
- .2 Copper tube: screwed, soldered, brazed.
- .3 Provide threaded or grooved-end type fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded.
- .3 Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into pipe when pressure is applied will not be permitted.
- .4 Rubber gasketed grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 32 mm and larger.
- .5 Fittings: ULC approved for use in wet pipe sprinkler systems.
- .6 Ensure fittings, mechanical couplings, and rubber gaskets are supplied by same manufacturer.
- .7 Side outlet tees using rubber gasketed fittings are not permitted.
- .8 Sprinkler pipe and fittings: metal.
- .3 Pipe hangers:
 - .1 ULC listed for fire protection services in accordance with NFPA.

2.3 SPRINKLER HEADS

- .1 General: to ANSI/NFPA 13 and ULC listed for fire services.
- .2 Sprinkler Head Type:
 - .1 Type A: upright bronze.
 - .2 Type B: dry type pendant sprinkler, ceiling mounted
- .3 Provide nominal 1.2cm orifice sprinkler heads.
 - .1 Release element of each head to be suitable for specific application.
 - .2 Provide corrosion-resistant sprinkler heads and sprinkler head guards in accordance with NFPA 13.
 - .3 Deflector: not more than 75mm below suspended ceilings.
 - .4 Ceiling plates: not more than 25mm deep.
 - .5 Ceiling cups: not permitted.

2.4 ESCUTCHEON PLATES

- .1 Provide one piece split hinge type metal plates for piping passing through walls, floors, and ceilings in exposed spaces.
- .2 Provide polished stainless steel plates chromium-plated finish on copper alloy plates in finished spaces.
- .3 Provide paint finish on metal plates in unfinished spaces.

2.5 SIGNS

- .1 Attach properly lettered Bilingual and approved metal signs to each

valve and alarm device to ANSI/NFPA 13.

- .2 Permanently fix hydraulic design data nameplates to riser of each system.

2.6 SPARE PARTS CABINET

- .1 Provide metal cabinet with extra sprinkler heads and sprinkler head wrench adjacent to each alarm valve. Number and types of extra sprinkler heads as specified in NFPA 13.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install, inspect and test to acceptance in accordance with ANSI/NFPA 13 and ANSI/NFPA 25.

3.3 PIPE INSTALLATION

- .1 Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings.
- .2 Keep interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter.
- .3 Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter.
- .4 Inspect piping before placing into position.

3.4 CONNECTIONS TO EXISTING WATER SUPPLY SYSTEMS

- .1 Notify Contracting Officer in writing at least 15 days prior to connection date.
- .2 Use valve and mechanical joint type sleeves for connections to be made under pressure.

3.5 FIELD PAINTING

- .1 Clean, pretreat, prime, and paint new systems including valves, piping, conduit, hangers, supports, miscellaneous metalwork, and accessories.
- .2 Apply coatings to clean, dry surfaces, using clean brushes.
- .3 Clean surfaces to remove dust, dirt, rust, and loose mill scale.
- .4 Immediately after cleaning, provide metal surfaces with 1 coat of pretreatment primer applied to minimum dry film thickness of 0.3 ml, and one coat of zinc chromate primer applied to minimum dry film thickness of 1.0 ml.
- .5 Shield sprinkler heads with protective covering while painting is in progress.
- .6 Upon completion of painting, remove protective covering from sprinkler heads.
- .7 Remove sprinkler heads which have been painted and replace with new sprinkler heads.
- .8 Provide primed surfaces with following:
 - .1 Piping in Finished Areas:
 - .1 Provide primed surfaces with 2 coats of paint to match adjacent surfaces.
 - .2 Provide valves and operating accessories with 1 coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil.
 - .3 Provide piping with 50 mm wide self-adhering red plastic bands spaced at maximum of 6 m intervals throughout piping systems.
 - .2 Piping in Unfinished Areas:
 - .1 Provide primed surfaces with one coat of red alkyd gloss enamel applied to minimum dry film thickness of 1.0 mil in spaces above suspended ceilings, crawl spaces, pipe chases, mechanical equipment room, and spaces where walls or ceiling are not painted or not constructed of a prefinished material.
 - .2 Provide piping with 50 mm wide red enamel bands spaced at maximum of 6 m intervals.

3.6 FIELD QUALITY CONTROL

- .1 Site Test, Inspection:
 - .1 Perform test to determine compliance with specified requirements in presence of Consultant.
 - .2 Test, inspect, and approve piping before covering or concealing.

- .3 Preliminary Tests:
 - .1 Hydrostatically test each system at 200 psig for a 2 hour period with no leakage or reduction in pressure.
 - .2 Flush piping with potable water in accordance with NFPA 13.
- .4 Formal Tests and Inspections:
 - .1 Do not submit request for formal test and inspection until preliminary test and corrections are completed and approved.
 - .2 Submit written request for formal inspection at least 15 days prior to inspection date.
 - .3 Repeat required tests as directed.
 - .4 Correct defects and make additional tests until systems comply with contract requirements.
 - .5 Furnish appliances, equipment, instruments, connecting devices, and personnel for tests.
 - .6 Authority of Jurisdiction, will witness formal tests and approve systems before they are accepted.

- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.
- .3 Site Tests:
 - .1 Develop, detailed instructions for O & M of this installation.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 11 01 - General Instructions Minor Works.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .3 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .4 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 11 01 - General Instructions - Minor Works.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative Engineer Consultant before final inspection.
 - .3 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various conditions together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and components.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valve schedule and flow diagram.
 - .7 Colour coding chart.
 - .4 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.
 - .5 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
- .5 Closeout Submittals: (Cont'd)
 - .5 Performance data to include: (Cont'd)

- .2 Equipment performance verification test results.
- .3 Special performance data as specified.
- .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .6 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative Engineer Consultant for approval. Submission of individual data will not be accepted unless directed by Departmental Representative Engineer Consultant .
 - .2 Make changes as required and re-submit as directed by Departmental Representative Engineer Consultant .
- .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .8 Site records:
 - .1 Departmental Representative Engineer Consultant will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .9 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative Engineer Consultant for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Health and Safety Requirements: do construction occupational health

and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.3 MAINTENANCE

- .1 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 11 01 - General Instructions - Minor Works.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 11 01 - General Instructions - Minor Works.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Materials and products in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Do verification requirements in accordance with Section 01 11 01 - General Instructions - Minor Works.

PART 3 - EXECUTION

3.1 PAINTING REPAIRS AND RESTORATION

- .1 Do painting in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and refrigeration units.

3.3. FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Section 01 11 01 - General Instructions - Minor Works and submit report as described in PART 1 - SUBMITTALS.

- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

- .1 Departmental Representative Engineer Consultant will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.
- .5 Departmental Representative Engineer Consultant will record these demonstrations on video tape for future reference.

3.5 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.
- .2 Separate dissimilar metals by means of gaskets or shims of approved material or use dielectric unions or flanges in order to prevent electrolytic action. Where piping of dissimilar metals are connected, use approved dielectric unions or couplings. A brass fitting or brass valve may also be used in making connections between copper and steel piping.

END OF SECTION

PART 1 - GENERAL

1.1 DESIGN REQUIREMENTS

- .1 Pure Water System
 - .1 Provide all field piping to new humidifier units from existing reverse osmosis system.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Indicate following items:
 - .1 Pure Water Piping, Fittings and Valves.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for Pure Water System for incorporation into manual specified in Section 01 11 01 - General Instructions - Minor Works.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Consultant.
- .5 Divert unused aggregate materials from landfill to quarry facility for reuse as approved by Consultant.
- .6 Unused paint or coating material must be disposed of at an official hazardous material collections site as approved by Owner.
- .7 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 RO WATER PIPING AND VALVES

- .1 Includes piping designated on drawings as pure water or reverse osmosis, supply and return.

- .2 Use Type 316 seamless, stainless steel tubing to ASTM A213/A269, for all piping, fittings, valves and piping components. Tubing to be chemically cleaned and passivated. Maximum operating pressure 13.7 MPa.
- .3 Compression style joints are acceptable. Use three piece S/S ball valves only. Use S/S needle or globe valves where balancing valves are shown on drawings.
- .4 Use S/S three piece ball valves with threaded hose connection and cap where hose bibs are shown on drawings in RO system.

PART 3 - EXECUTION

3.1 PURE WATER PIPING INSTALLATION

- .1 In accordance with manufacturer's recommendations.
- .2 Suitable for insulation in accordance with Section 21 07 19.
- .3 Provide firestopping materials suitable for piping in accordance with the Ontario Building Code.

3.2 INSTALLATION

- .1 Pure Water Systems
 - .1 Install all piping and fittings in accordance with manufacturer's instructions and under manufacturer's supervision, to ensure contaminant free piping system. Provide water purity test results. Water to be tested to meet ASME Water Specifications - Type IV.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Not Used.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .3 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .4 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 11 01 - General Instructions - Minor Works.
 - .2 Operation and maintenance manual approved by, and final copies deposited with Consultant before final inspection.
 - .3 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various conditions together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valve schedule and flow diagram.
 - .7 Colour coding chart.
 - .4 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.
- .6 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.

- .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .7 Approvals:
 - .1 Submit 2 copies of draft Operation and Maintenance Manual to Consultant for approval. Submission of individual data will not be accepted unless directed by Consultant.
 - .2 Make changes as required and re-submit as directed by Consultant.
- .8 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .9 Site records:
 - .1 Consultant will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .10 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Consultant for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .13 Submit copies of as-built drawings for inclusion in final TAB report.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.4 MAINTENANCE

- .1 Furnish spare parts in accordance with Section 01 11 01 - General Instructions - Minor Works as follows:
 - .1 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.
- .2 Provide one set of special tools required to service equipment as recommended by

manufacturers and in accordance with Section 01 11 01 - General Instructions - Minor Works.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 11 01 - General Instructions - Minor Works.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Materials and products in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Do verification requirements in accordance with Section 01 11 01 - General Instructions - Minor Works.

PART 3 - EXECUTION

3.1 PAINTING REPAIRS AND RESTORATION

- .1 Do painting in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Prime and touch up marred finished paintwork to match original.
- .3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Section 01 11 01 - General Instructions - Minor Works and submit report as described in PART 1 - SUBMITTALS.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION

- .1 Consultant will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
 - .1 Packaged Cooling Units
- .3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .5 Instruction duration time requirements as specified in appropriate sections.
- .6 Consultant will record these demonstrations on video tape for future reference.

3.5 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.
- .2 Separate dissimilar metals by means of gaskets or shims of approved material or use dielectric unions or flanges in order to prevent electrolytic action. Where piping of dissimilar metals is connected, use approved dielectric unions or couplings. A brass fitting or brass valve may also be used in making connections between copper and steel piping.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 11 01 - General Instructions - Minor Works.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Consultant.

PART 2 - PRODUCTS

2.1 BELOW GRADE MECHANICAL SEALS AND SLEEVES

- .1 Sleeves: For diameters up to 610mm use molded non-metallic high density polyethylene sleeves (HDPE) with integral hollow, molded water-stop ring 100mm larger than the outside diameter of the sleeve itself. End caps and reinforcing ribs, domestically manufactured in an approved ISO-9001:2000 facility.

PART 3 - EXECUTION

3.1 CONNECTIONS TO EQUIPMENT

- .1 In accordance with manufacturer's instructions unless otherwise indicated.
- .2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

- .3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement.

3.2 CLEARANCES

- .1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.
- .2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, components.

3.3 DRAINS

- .1 Install piping with grade in direction of flow except as indicated.
- .2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.
- .3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.
- .4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

3.4 PIPEWORK INSTALLATION

- .1 Screwed fittings jointed with Teflon tape.
- .2 Protect openings against entry of foreign material.
- .3 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.
- .4 Assemble piping using fittings manufactured to ANSI standards.
- .5 Saddle type branch fittings may be used on mains if branch line is no larger than half the size of main.
 - .1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.
- .6 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.
- .7 Install concealed pipework to minimize furring space, maximize headroom, conserve space.
- .8 Slope piping, except where indicated, in direction of flow for positive drainage and venting.

- .9 Install, except where indicated, to permit separate thermal insulation of each pipe.
- .10 Group piping wherever possible and as indicated.
- .11 Ream pipes, remove scale and other foreign material before assembly.
- .12 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.
- .13 Provide for thermal expansion as indicated.
- .14 Valves:
 - .1 Install in accessible locations.
 - .2 Remove interior parts before soldering.
 - .3 Install with stems above horizontal position unless otherwise indicated.
 - .4 Valves accessible for maintenance without removing adjacent piping.
 - .5 Install globe valves in bypass around control valves.
 - .6 Use ball valves at branch take-offs for isolating purposes except where otherwise specified.
 - .7 Use chain operators on valves NPS 2-1/2 and larger where installed more than 2400 mm above floor in Mechanical Rooms.

3.5 SLEEVES

- .1 General: Install where pipes pass through masonry, concrete structures, fire rated assemblies, and elsewhere as indicated.
- .2 Material: Schedule 40 black steel pipe.
- .3 Construction: Foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.
- .4 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.
- .5 Installation:
 - .1 Concrete, masonry walls, concrete floors on grade: Terminate flush with finished surface.
 - .2 Other floors: Terminate 25 mm above finished floor.
 - .3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.
- .6 Sealing:
 - .1 Foundation walls and below grade floors: Fire retardant, waterproof non-hardening mastic.
 - .2 Elsewhere: Provide space for firestopping. Maintain fire rating integrity.
 - .3 Sleeves installed for future use: Fill with lime plaster or other

easily removable filler.

- .4 Ensure no contact between copper pipe or tube and sleeve.

3.6 ESCUTCHEONS

- .1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.
- .2 Construction: One piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.
- .3 Sizes: Outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

3.7 FLUSHING OUT OF PIPING SYSTEMS

- .1 Before start-up, clean interior of piping systems in accordance with requirements of Section 01 11 01 - General Instructions Minor Works supplemented as specified in relevant sections of Division 23.
- .2 Preparatory to acceptance, clean and refurbish equipment and leave in operating condition, including replacement of filters in piping systems.

3.8 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK

- .1 Advise Consultant 48 hours minimum prior to performance of pressure tests.
- .2 Pipework: Test as specified in relevant sections of Division 23.
- .3 Maintain specified test pressure without loss for 4 hours minimum unless specified for longer period of time in relevant sections of Division 23.
- .4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.
- .5 Conduct tests in presence of Consultant.
- .6 Pay costs for repairs or replacement, retesting, and making good. Consultant to determine whether repair or replacement is appropriate.
- .7 Insulate or conceal work only after approval and certification of tests by Consultant.

3.9 EXISTING SYSTEMS

- .1 Connect into existing piping systems at times approved by Consultant.
- .2 Request written approval 10 days minimum, prior to commencement of work.
- .3 Be responsible for damage to existing plant by this work.
- .4 Ensure daily clean-up of existing areas.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Section Includes:
 - .1 Bronze - valves.
- .2 Related Sections:
 - .1 Section 01 11 01 - General Instructions - Minor Works.
 - .2 Section 23 05 05 - Installation of Pipework.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME).
 - .1 ANSI/ASME B1.20.1-1983(R2001), Pipe Threads, General Purpose (Inch).
 - .2 ANSI/ASME B16.18-2001, Cast Copper Alloy Solder Joint Pressure Fittings.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A 276-04, Specification for Stainless Steel Bars and Shapes.
 - .2 ASTM B 62-02, Specification for Composition Bronze or Ounce Metal Castings.
 - .3 ASTM B 283-99a, Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).
 - .4 ASTM B 505/B 505M-02, Specification for Copper-Base Alloy Continuous Castings.
- .3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
 - .1 MSS-SP-25-1998, Standard Marking System for Valves, Fittings, Flanges and Unions.
 - .2 MSS-SP-80-2003, Bronze Gate Globe, Angle and Check Valves.
 - .3 MSS-SP-110-1996, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
 - .1 Submit shop drawings and product data in accordance with Section 01 11 01 - General Instructions - Minor Works.
 - .2 Submit data for valves specified in this section.

- .3 Closeout Submittals:
 - .1 Submit maintenance data for incorporation into manual specified in Section 01 11 01 - General Instructions - Minor Works.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.5 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
- .2 Separate and recycle waste materials in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Valves:
 - .1 Except for specialty valves, to be single manufacturer.
 - .2 All products to have CRN registration numbers.
- .2 End Connections:
 - .1 Connection into adjacent piping/tubing:
 - .1 Steel pipe systems: Screwed ends to ANSI/ASME B1.20.1.
 - .2 Copper tube systems: Solder ends to ANSI/ASME B16.18.
- .3 Gate Valves:
 - .1 NPS 2 and under, rising stem, solid wedge disc, Class 150:
 - .1 Body: with long disc guides, screwed bonnet.
 - .2 Operator: Handwheel.
- .4 Ball Valves:
 - .1 NPS 2 and under:
 - .1 Body and cap: cast high tensile bronze to ASTM B 62.
 - .2 Pressure rating: 2760-kPa CWP 4140-kPa CWP, 860 kPa steam.
 - .3 Connections: Screwed ends to ANSI B1.20.1 and with hexagonal shoulders, solder ends to ANSI.
 - .4 Stem: stainless steel, tamperproof ball drive.
 - .5 Stem packing nut: external to body.

- .6 Ball and seat: replaceable stainless steel solid ball and teflon seats.
- .7 Stem seal: TFE with external packing nut.
- .8 Operator: removable lever handle.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install rising stem valves in upright position with stem above horizontal.
- .2 Remove internal parts before soldering.
- .3 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance, and equipment removal.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1-04, Power Piping.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 125-1996(R2001), Specification for Steel Springs, Helical, Heat-Treated.
 - .2 ASTM A 307-04, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 563-04a, Specification for Carbon and Alloy Steel Nuts.
- .3 Factory Mutual (FM)
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
 - .1 MSS SP 58-2002, Pipe Hangers and Supports - Materials, Design and Manufacture.
 - .2 ANSI/MSS SP69-2003, Pipe Hangers and Supports - Selection and Application.
 - .3 MSS SP 89-2003, Pipe Hangers and Supports - Fabrication and Installation Practices.
- .6 Underwriter's Laboratories of Canada (ULC).

1.3 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in Ontario.
- .3 Submit shop drawings and product data for following items:
 - .1 Bases, hangers and supports.
 - .2 Connections to equipment and structure.
 - .3 Structural assemblies.
- .4 Quality assurance submittals: submit following in accordance with Section 01 11 01 - General Instructions - Minor Works.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance

characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions.

.5 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual specified in Section 01 11 01- General Instructions - Minor Works.

1.4 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 01 11 01 - General Instructions - Minor Works.

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

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 11 01 - General Instructions - Minor Works.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS SP 58.

.2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2 PIPE HANGERS

.1 Finishes:

.1 Pipe hangers and supports: stainless steel, hot dip galvanized, copper, aluminum.

.2 Use hot dipped galvanizing process.

.3 Ensure steel hangers in contact with copper piping are copper, copper plated or epoxy coated.

.2 Upper attachment structural: suspension from lower flange of I-Beam:

.1 Cold piping NPS 2 maximum: malleable iron C-clamp with hardened steel cup point setscrew, locknut and retaining clip.

- .1 Rod: 13 mm FM approved.
- .3 Upper attachment structural: suspension from upper flange of I-Beam:
 - .1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, to MSS SP 69.
- .4 Upper attachment to concrete:
 - .1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm minimum greater than rod diameter.
 - .2 Concrete inserts: wedge shaped body with knockout protector plate to MSS SP 69.
- .5 Shop and field-fabricated assemblies:
 - .1 Trapeze hanger assemblies:.
 - .2 Steel brackets:.
 - .3 Sway braces for seismic restraint systems: to Section.
- .6 Hanger rods: threaded rod material to MSS SP 58:
 - .1 Ensure that hanger rods are subject to tensile loading only.
 - .2 Provide linkages where lateral or axial movement of pipework is anticipated.
 - .3 Do not use 22 mm or 28 mm rod.
- .7 Pipe attachments: material to MSS SP 58:
 - .1 Attachments for steel piping: carbon steel black galvanized.
 - .2 Attachments for copper piping: copper plated black steel.
 - .3 Use insulation shields for hot pipework.
 - .4 Oversize pipe hangers and supports.
- .8 Adjustable clevis: material to MSS SP 69 UL listed FM approved, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
 - .1 Ensure "U" has hole in bottom for rivetting to insulation shields.

2.3 RISER CLAMPS

- .1 Steel or cast iron pipe: galvanized carbon steel to MSS SP 58, type 42, FM approved.
- .2 Copper pipe: carbon steel copper plated to MSS SP 58, type 42.
- .3 Bolts: to ASTM A 307.
- .4 Nuts: to ASTM A 563.

2.4 INSULATION PROTECTION SHIELDS

- .1 Insulated cold piping:
 - .1 64 kg/m³ density insulation plus insulation protection shield

to: MSS SP 69, galvanized sheet carbon steel. Length designed for maximum 3 m span.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install in accordance with:
 - .1 manufacturer's instructions and recommendations.
- .2 Vibration Control Devices:
 - .1 Install on piping systems for condensing units as indicated.
- .3 Clamps on riser piping:
 - .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
 - .2 Bolt-tightening torques to industry standards.
 - .3 Steel pipes: install below coupling or shear lugs welded to pipe.
 - .4 Cast iron pipes: install below joint.
- .4 Clevis plates:
 - .1 Attach to concrete with 4 minimum concrete inserts, at each corner.
- .5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

3.3 HANGER SPACING

- .1 Plumbing piping: to Canadian Plumbing Code, OBC.
- .2 Fire protection: to applicable fire code.
- .3 Gas piping: up to NPS 1/2: every 1.8 m.
- .4 Copper piping: up to NPS 1/2: every 1.5 m.
- .5 Flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.
- .6 Within 300 mm of each elbow.

Maximum Pipe Size : NPS	Maximum Spacing Steel	Maximum Spacing Copper
up to 1-1/4	2.1 m	1.8 m
1-1/2	2.7 m	2.4 m

- .7 Pipework greater than NPS 12: to MSS SP 69.

3.4 HANGER INSTALLATION

- .1 Install hanger so that rod is vertical under operating conditions.
- .2 Adjust hangers to equalize load.
- .3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.

3.5 HORIZONTAL MOVEMENT

- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.
- .2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.6 FINAL ADJUSTMENT

- .1 Adjust hangers and supports:
 - .1 Ensure that rod is vertical under operating conditions.
 - .2 Equalize loads.
- .2 Adjustable clevis:
 - .1 Tighten hanger load nut securely to ensure proper hanger performance.
 - .2 Tighten upper nut after adjustment.
- .3 C-clamps:
 - .1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.
- .4 Beam clamps:
 - .1 Hammer jaw firmly against underside of beam.

3.7 FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Section 01 11 01
 - General Instructions - Minor Works and submit report as described in PART 1 - SUBMITTALS.

- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.60-97, Interior Alkyd Gloss Enamel.
 - .2 CAN/CGSB-24.3-92, Identification of Piping Systems.

1.2 SUBMITTALS

- .1 Product Data:
- .2 Submittals: in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .3 Product data to include paint colour chips, other products specified in this section.

1.3 QUALITY ASSURANCE

- .1 Quality assurance submittals: submit following in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 11 01 - General Instructions - Minor Works.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 11 01 - General Instructions - Minor Works.
 - .2 Dispose of unused paint coating material at official hazardous material collections site approved by Consultant.
 - .3 Do not dispose of unused paint coating material into sewer system, into streams, lakes, onto ground or in locations where it will pose health or environmental hazard.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

- .1 Metal or plastic laminate nameplate mechanically fastened to each piece of equipment by manufacturer.
- .2 Lettering and numbers raised or recessed.
- .3 Information to include, as appropriate:
 - .1 Equipment: manufacturer's name, model, size, serial number, capacity.
 - .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 SYSTEM NAMEPLATES

- .1 Colours:
 - .1 Hazardous: red letters, white background.
 - .2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).
- .2 Construction:
 - .1 3 mm thick laminated plastic or white anodized aluminum, matte finish, with square corners, letters accurately aligned and machine engraved into core.
- .3 Sizes:
 - .1 Conform to following table:

Size # mm	Sizes (mm)	No. of Lines	Height of Letters (mm)
1	10 x 50	1	3
2	13 x 75	1	5
3	13 x 75	2	3
4	20 x 100	1	8
5	20 x 100	2	5
6	20 x 200	1	8
7	25 x 125	1	12
8	25 x 125	2	8
9	35 x 200	1	20

- .2 Use maximum of 25 letters/numbers per line.
- .4 Identification for PWGSC Preventive Maintenance Support System (PMSS):
 - .1 Use arrangement of Main identifier, Source identifier, Destination identifier.
 - .2 Equipment in Mechanical Room:
 - .1 Main identifier: size #9.

- .2 Source and Destination identifiers: size #6.
- .3 Terminal cabinets, control panels: size #5.
- .3 Equipment elsewhere: sizes as appropriate.

2.3 EXISTING IDENTIFICATION SYSTEMS

- .1 Apply existing identification system to new work.
- .2 Where existing identification system does not cover for new work, use identification system specified this section.
- .3 Before starting work, obtain written approval of identification system from Departmental Representative and Consultant.

2.4 PIPING SYSTEMS GOVERNED BY CODES

- .1 Identification:
 - .1 Natural gas: to CSA/CGA B149.1 authority having jurisdiction.
 - .2 Propane gas: to CSA/CGA B149.1 authority having jurisdiction.
 - .3 Sprinklers: to NFPA 13.

2.5 IDENTIFICATION OF PIPING SYSTEMS

- .1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.
- .2 Pictograms:
 - .1 Where required: Workplace Hazardous Materials Information System (WHMIS) regulations.
- .3 Legend:
 - .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.
- .4 Arrows showing direction of flow:
 - .1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.
 - .2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.
 - .3 Use double-headed arrows where flow is reversible.
- .5 Extent of background colour marking:
 - .1 To full circumference of pipe or insulation.
 - .2 Length to accommodate pictogram, full length of legend and arrows.
- .6 Materials for background colour marking, legend, arrows:
 - .1 Pipes and tubing 20 mm and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.
 - .2 Other pipes: pressure sensitive plastic-coated cloth vinyl with

protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150 degrees C and intermittent temperature of 200 degrees C.

.7 Colours and Legends:

.1 Where not listed, obtain direction from Departmental Representative Engineer Consultant.

.2 Colours for legends, arrows: to following table:

<u>Background colour:</u>	<u>Legend, arrows:</u>
Yellow	BLACK
Green	WHITE
Red	WHITE

.3 Background colour marking and legends for piping systems:

<u>Contents</u>	<u>Background Colour</u>	<u>Legend Marking</u>
Sanitary	Green	SAN
Refrigeration suction	Yellow	REF. SUCTION
Refrigeration liquid	Yellow	REF. LIQUID
Refrigeration hot gas	Yellow	REF. HOT GAS
RO water	Green	RO. WATER
RO water return	Green	RO. WATER CIRC
Process water supply	Green	PROCESS. WATER SUP
Process water return	Green	PROCESS. WATER RET

2.6 VALVES, CONTROLLERS

.1 Brass tags with 12 mm stamped identification data filled with black paint.

.2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.

2.7 CONTROLS COMPONENTS IDENTIFICATION

.1 Identify all systems, equipment, components, controls, sensors with system nameplates specified in this section.

.2 Inscriptions to include function and (where appropriate) fail-safe position.

2.8 LANGUAGE

.1 Identification in English and French.

- .2 Use one nameplate and label for both languages.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 TIMING

- .1 Provide identification only after painting specified Section 09 91 23 - Interior Painting has been completed.

3.3 INSTALLATION

- .1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.
- .2 Provide ULC or CSA registration plates as required by respective agency.
- .3 Identify systems, equipment to conform to PWGSC PMSS.

3.4 NAMEPLATES

- .1 Locations:
 - .1 In conspicuous location to facilitate easy reading and identification from operating floor.
- .2 Standoffs:
 - .1 Provide for nameplates on hot and/or insulated surfaces.
- .3 Protection:
 - .1 Do not paint, insulate or cover.

3.5 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

- .1 On long straight runs in open areas in boiler rooms, equipment rooms: a not more than 6 m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
- .2 Adjacent to each change in direction.

- .3 At least once in each small room through which piping or ductwork passes.
- .4 On both sides of visual obstruction or where run is difficult to follow.
- .5 On both sides of separations such as walls, floors, partitions.
- .6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.
- .7 At beginning and end points of each run and at each piece of equipment in run.
- .8 At point immediately upstream of major manually operated or automatically controlled valves, and dampers. Where this is not possible, place identification as close as possible, preferably on upstream side.
- .9 Identification easily and accurately readable from usual operating areas and from access points.
 - .1 Position of identification approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.6 VALVES, CONTROLLERS

- .1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed "S" hooks.
- .2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by Consultant. Provide one copy in each operating and maintenance manual.
- .3 Number valves in each system consecutively.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 11 01 - General Instructions - Minor Works.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

- .1 Related Sections:
 - .1 Section 01 11 01 - General Instructions - Minor Works.
 - .2 Section 23 05 05 - Installation of Pipework.

1.2 REFERENCES

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME B16.22-01, Wrought Copper and Copper Alloy Solder - Joint Pressure Fittings.
 - .2 ASME B16.24-02, Cast Copper Pipe Flanges and Flanged Fittings: Class 150, 300, 400, 600, 900, 1500 and 2500.
 - .3 ASME B16.26-88, Cast Copper Alloy Fittings for Flared Copper Tubes.
 - .4 ASME B31.5-01, Refrigeration Piping and Heat Transfer Components.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A 307-04, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .2 ASTM B 280-03, Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B52-99, Mechanical Refrigeration Code.
- .4 Environment Canada (EC)
 - .1 EPS 1/RA/1-96, Environmental Code of Practice for the Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems.
- .5 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 11 01 - Submittal Procedures.
- .2 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .4 Instructions: submit manufacturer's installation instructions.

- .5 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 11 01 - General Instructions - Minor Works.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29 - Health and Safety Requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Not Used.

2.2 TUBING

- .1 Processed for refrigeration installations, deoxidized, dehydrated and sealed.
 - .1 Hard copper: to ASTM B 280, type ACR.
 - .2 Annealed copper: to ASTM B 280, with minimum wall thickness as per CSA B52 and ASME B31.5.

2.3 FITTINGS

- .1 Service: design pressure 3500 kPa and temperature 121 degrees C.
- .2 Brazed:
 - .1 Fittings: wrought copper to ASME B16.22.
 - .2 Joints: silver solder, 15% Ag-80% Cu-5%P or copper-phosphorous, 95% Cu-5%P and non-corrosive flux.
- .3 Flanged:
 - .1 Bronze or brass, to ASME B16.24, Class 150 and Class 300.
 - .2 Gaskets: suitable for service.
 - .3 Bolts, nuts and washers: to ASTM A 307, heavy series.
- .4 Flared:
 - .1 Bronze or brass, for refrigeration, to ASME B16.26.

2.4 PIPE SLEEVES

- .1 Hard copper or steel, sized to provide 6 mm clearance around between sleeve and uninsulated pipe or between sleeve and insulation.

2.5 VALVES

- .1 22 mm and under: Class 500, 3.5 Mpa, globe or angle non-directional type, diaphragm, packless type, with forged brass body and bonnet, moisture proof seal for below freezing applications, brazed connections.
- .2 Over 22 mm: Class 375, 3.5 Mpa, globe or angle type, diaphragm, packless type, back-seating, cap seal, with cast bronze body and bonnet, moisture proof seal for below freezing applications, brazed connections.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 GENERAL

- .1 Install in accordance with CSA B52, EPS1/RA/1 and ASME B31.5 Section 23 05 01 - Installation of Pipework.

3.3 BRAZING PROCEDURES

- .1 Bleed inert gas into pipe during brazing.
- .2 Remove valve internal parts, solenoid valve coils, sight glass.
- .3 Do not apply heat near expansion valve and bulb.

3.4 PIPING INSTALLATION

- .1 General:
 - .1 Soft annealed copper tubing: bend without crimping or constriction Hard drawn copper tubing: do not bend. Minimize use of fittings.
- .2 Hot gas lines:
 - .1 Pitch at least 1:240 down in direction of flow to prevent oil return to compressor during operation.
 - .2 Provide trap at base of risers greater than 2400 mm high and at each 7600 mm thereafter.
 - .3 Provide inverted deep trap at top of risers.

- .4 Provide double risers for compressors having capacity modulation.
 - .1 Large riser: install traps as specified.
 - .2 Small riser: size for 5.1 m/s at minimum load. Connect upstream of traps on large riser.

3.5 PRESSURE AND LEAK TESTING

- .1 Close valves on factory charged equipment and other equipment not designed for test pressures.
- .2 Leak test to CSA B52 before evacuation to 2MPa and 1MPa on high and low sides respectively.
- .3 Test Procedure: build pressure up to 35 kPa with refrigerant gas on high and low sides. Supplement with nitrogen to required test pressure. Test for leaks with electronic or halide detector. Repair leaks and repeat tests.

3.6 FIELD QUALITY CONTROL

- .1 Site Tests/Inspection:
 - .1 Close service valves on factory charged equipment.
- .2 Ambient temperatures to be at least 13 degrees C for at least 12 hours before and during dehydration.
- .3 Use copper lines of largest practical size to reduce evacuation time.
- .4 Use two-stage vacuum pump with gas ballast on 2nd stage capable of pulling 5Pa absolute and filled with dehydrated oil.
- .5 Measure system pressure with vacuum gauge. Take readings with valve between vacuum pump and system closed.
- .6 Triple evacuate system components containing gases other than correct refrigerant or having lost holding charge as follows:
 - .1 Twice to 14 Pa absolute and hold for 4 h.
 - .2 Break vacuum with refrigerant to 14 kPa.
 - .3 Final to 5 Pa absolute and hold for at least 12 h.
 - .4 Isolate pump from system, record vacuum and time readings until stabilization of vacuum.
 - .5 Submit test results to Consultant.
- .7 Charging:
 - .1 Charge system through filter-drier and charging valve on high side. Low side charging not permitted.
 - .2 With compressors off, charge only amount necessary for proper operation of system. If system pressures equalize before system is

fully charged, close charging valve and start up. With unit operating, add remainder of charge to system.

.3 Re-purge charging line if refrigerant container is changed during charging process.

.8 Checks:

.1 Make checks and measurements as per manufacturer's operation and maintenance instructions.

.2 Record and report measurements.

3.7 CLEANING

.1 Perform cleaning operations in accordance with manufacturer's recommendations.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.1-2012, Canadian Electrical Code, Part 1 (21st Edition), Safety Standard for Electrical Installations.
 - .2 CSA C22.2.
- .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 The Ontario Electrical Safety Code 2012, and all bulletins (Ontario).
- .4 Hydro requirements and local applicable codes and regulations.

1.2 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification nameplates and labels for control items in English.

1.3 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 01.
- .2 Product Data: submit WHMIS MSDS.
- .3 Shop drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario within 3 weeks of Award of Contract.
- .4 Quality Control: in accordance with Sections 01 11 01.
 - .1 Provide CSA certified equipment and material.
 - .2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction approval before delivery to site.

- .3 Submit test results of installed electrical systems and instrumentation.
- .4 Permits and fees: in accordance with General Conditions of contract. Pay associated fees. Departmental Representative will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
- .5 Submit, upon completion of Work, load balance report as described in PART 3 - Load Balance.
- .6 Submit certificate of acceptance from Electrical Inspection Department authority having jurisdiction upon completion of Work to Departmental Representative.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Sections 01 11 01.
- .2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
 - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .3 Site Meetings:
 - .1 In accordance with Section 01 11 01 and Section 01 35 29.
- .4 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Material Delivery Schedule: provide Departmental Representative with schedule within 2 weeks after award of Contract.
- .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Sections 01 11 01.

1.6 SYSTEM STARTUP

- .1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.

PART 2 - PRODUCTS

2.1 SUSTAINABLE REQUIREMENTS

- .1 Materials and products in accordance with Section 01 11 01.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide material and equipment in accordance with Sections 01 11 01.
- .2 Material and equipment to be CSA certified. Where CSA certified material and equipment is not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - Submittals.

2.3 WIRING TERMINATIONS

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

2.4 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: lamacoid 3 mm thick plastic engraving sheet black face, white core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
 - .2 Sizes as follows:

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels: embossed plastic labels with 6 mm high letters unless specified otherwise.

- .3 Wording on nameplates and labels to be approved by Departmental Representative prior to manufacture.
- .4 Allow for minimum of twenty-five (25) letters per nameplate.
- .5 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .6 Identify equipment with Size 3 labels engraved "ASSET INVENTORY No. ()" as directed by Departmental Representative .
- .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .8 Terminal cabinets and pull boxes: indicate system and voltage.

2.5 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, numbered coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA-C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.8 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other	Green	Blue
Communication Systems		
Fire Alarm	Red	
Emergency	Red	Blue

Voice		
Other	Red	Yellow
Security		
<u>Systems</u>		

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Do complete installation in accordance with CSA-C22.1 except where specified otherwise.

3.2 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .2 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

3.4 LOCATION OF OUTLETS

- .1 Locate outlets in accordance with Section 26 05 32.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .4 Locate light switches on latch side of doors.
 - .1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.

3.5 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centerline of equipment unless specified or indicated otherwise.

- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1400 mm, maximum 1200 mm for accessible space.
 - .2 Wall receptacles:
 - .1 General: 300 mm.

3.6 FIELD QUALITY CONTROL

- .1 Verification requirements in accordance with Section 01 11 01, include:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.
 - .4 Resource reuse.
 - .5 Recycled content.
 - .6 Local/regional materials.
 - .7 Certified wood.
 - .8 Low-emitting materials.

3.7 CLEANING

- .1 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .2 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION

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PART 1 - GENERAL

1.1 REFERENCES

- .1 CSA International
 - .1 CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes and Fittings.
 - .2 CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
- .2 National Electrical Manufacturers Association (NEMA)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 01.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 11 01.
- .2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Clamps or connectors for armoured cable as required to: CAN/CSA-C22.2 No.18.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
 - .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.
 - .3 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 01.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish,

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tools and equipment in accordance with Section 01 11 01.

- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Sections 01 11 01.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

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PART 1 - GENERAL

1.1 PRODUCT DATA

- .1 Provide product data in accordance with Section 01 11 01.

PART 2 - PRODUCTS

2.1 BUILDING WIRES

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

2.2 ARMOURED CABLES

- .1 Conductors: insulated, copper, size as indicated.
- .2 Type: AC90 lead sheath over cable assembly and under armour].
- .3 Armour: interlocking type fabricated from galvanized steel strip.
- .4 Connectors: anti short connectors.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 and 01 11 01.
- .2 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

- .1 Terminate cables in accordance with Section 26 05 20.
- .2 Cable Colour Coding: to Section 26 05 00.

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- .3 Lace or clip groups of feeder cables at distribution centers, pull boxes, and termination points.
- .4 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.

3.3 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34.

3.4 INSTALLATION OF ARMOURED CABLES

- .1 Group cables wherever possible on channels.

END OF SECTION

PART 1 - GENERAL

1.1 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 11 01.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 SUPPORT CHANNELS

- .1 U shape, size 41 x 41 mm, 2.5 mm thick, suspended.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Secure equipment to hollow masonry with lead anchors.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.

- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
 - .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two or more conduits use channels at 1 m on centre spacing.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .13 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

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PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-09, Canadian Electrical Code, Part 1, 21st Edition.

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Sections 01 11 01.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Provide shop drawings: in accordance with Sections 01 11 01.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Sections 01 11 01.

PART 2 - PRODUCTS

2.1 JUNCTION AND PULL BOXES

- .1 Construction: welded steel enclosure.
- .2 Covers Flush Mounted: 25 mm minimum extension all around.
- .3 Covers Surface Mounted: screw-on flat covers.

PART 3 - EXECUTION

3.1 SPLITTER INSTALLATION

- .1 Mount plumb, true and square to building lines.
- .2 Extend splitters full length of equipment arrangement except where

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indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.
- .3 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.3 IDENTIFICATION

- .1 Equipment Identification: to Section 26 05 00.
- .2 Identification Labels: size 2 indicating system name, voltage and phase or as indicated.

END OF SECTION

AAFC London	OUTLET BOXES, CONDUIT	SECTION 26 05 32
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PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.1-09, Canadian Electrical Code, Part 1, 21st Edition.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 11 01.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01.

PART 2 - PRODUCTS

2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1.
- .2 102 mm square or larger outlet boxes as required.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.

2.2 GALVANIZED STEEL OUTLET BOXES

- .1 One-piece electro-galvanized construction.
- .2 Single gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.
- .4 102 mm square or octagonal outlet boxes for lighting fixture outlets.

2.3 FITTINGS - GENERAL

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

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

END OF SECTION

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PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-C22.2 No. 18-98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - .2 CAN/CSA-C22.2 NO. 18.1-04, Metallic Outlet Boxes.
 - .3 CAN/CSA-C22.2 NO. 18.2-06, Nonmetallic Outlet Boxes.
 - .4 CAN/CSA-C22.2 No. 18.3-04(R2009), Conduit, Tubing, and Cable Fittings (Tri-National standard, with ANCE NMX-J-017 and UL 514B).
 - .5 CSA C22.2 No. 45.1-07, Electrical Rigid Metal Conduit - Steel (Tri-National standard, with UL 6 and NMX-J-534-ANCE-2007).
 - .6 CSA C22.2 No. 56-04(R2009), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .7 CSA C22.2 No. 83-M1985(R2008), Electrical Metallic Tubing.
 - .8 CSA C22.2 No. 211.2-06(R2011), Rigid PVC (Unplasticized) Conduit.
 - .9 CAN/CSA-C22.2 No. 227.3-05, Nonmetallic Mechanical Protection Tubing (NMPT), A National Standard of Canada (February 2006).

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 11 01.
- .2 Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - .1 Submit cable manufacturing data.
- .3 Quality assurance submittals:
 - .1 Test reports: submit certified test reports.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.

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PART 2 - PRODUCTS

2.1 CONDUITS

- .1 Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
- .2 Rigid PVC conduit: to CSA C22.2 No. 211.2.
- .3 Flexible metal conduit: to CSA C22.2 No. 56, steel.

2.2 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits NPS 2 50 mm and smaller.
 - .1 Two hole steel straps for conduits larger than NPS 2 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.

2.3 CONDUIT FITTINGS

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

2.4 FISH CORD

- .1 Polypropylene.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

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

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- .2 Conceal conduits except in mechanical and electrical service rooms in unfinished areas.
- .3 Surface mount conduits except in header housing.
- .4 Use electrical metallic tubing (EMT) except in cast concrete.
- .5 Use rigid PVC conduit underground.
- .6 Use flexible metal conduit for connection to motors in dry areas. Connection to surface or recessed fluorescent fixtures.
- .7 Minimum conduit size for lighting and power circuits: 19 mm.
- .8 Bend conduit cold:
 - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .9 Mechanically bend steel conduit over 19 mm diameter.
- .10 Install fish cord in empty conduits.
- .11 Remove and replace blocked conduit sections.
 - .1 Do not use liquids to clean out conduits.
- .12 Dry conduits out before installing wire.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Run conduits in flanged portion of structural steel.
- .3 Group conduits wherever possible on suspended] channels.
- .4 Do not pass conduits through structural members except as indicated.
- .5 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

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3.5 CLEANING

- .1 Proceed in accordance with Section 01 11 01.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

- .1 CSA International
 - .1 CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CAN/CSA-C22.2 No.42.1-00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
 - .3 CSA C22.2 No.55-M1986(R2008), Special Use Switches.
 - .4 CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national standard, with UL 20).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 01.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wiring devices and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 11 01.
- .2 Operation and Maintenance Data: submit operation and maintenance data for wiring devices for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect wiring devices from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

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PART 2 - PRODUCTS

2.1 SWITCHES

- .1 20 A, 120 V, single pole, switches to: CSA C22.2 No.55 and CSA C22.2 No.111.
- .2 Manually-operated general purpose AC switches with following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver alloy contacts.
 - .3 Urea or melamine moulding for parts subject to carbon tracking.
 - .4 Suitable for back and side wiring.
 - .5 Ivory toggle.
- .3 Toggle operated fully rated for tungsten filament and fluorescent lamps.
- .4 Switches of one manufacturer throughout project.

2.2 RECEPTACLES

- .1 Duplex receptacles, CSA type 5-20 R, 125 V, 20 A, U ground, to: CSA C22.2 No.42 with following features:
 - .1 Ivory urea moulded housing.
 - .2 Suitable for No. 10 AWG for back and side wiring.
 - .3 Break-off links for use as split receptacles.
 - .4 Eight back wired entrances, four side wiring screws.
 - .5 Triple wipe contacts and rivetted grounding contacts.
- .2 Other receptacles with ampacity and voltage as indicated.
- .3 Receptacles of one manufacturer throughout project.

2.3 COVER PLATES

- .1 Cover plates for wiring devices to: CSA C22.2 No.42.1.
- .2 Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
- .3 Stainless steel, 1 mm thick cover plates for wiring devices mounted in flush-mounted outlet box.
- .4 Sheet metal cover plates for wiring devices mounted in surface-mounted FS or FD type conduit boxes.
- .5 Weatherproof double lift spring-loaded cast aluminum cover plates, complete with gaskets for duplex receptacles as indicated.

- .6 Weatherproof spring-loaded cast aluminum cover plates complete with gaskets for single receptacles or switches.

2.6 SOURCE QUALITY CONTROL

- .1 Cover plates from one manufacturer throughout project.

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Switches:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount toggle switches at height.
- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Mount receptacles at height as indicated.
 - .3 Where split receptacle has one portion switched, mount vertically and switch upper portion.
 - .4 Install GFI type receptacles as indicated.
- .3 Cover plates:
 - .1 Install suitable common cover plates where wiring devices are grouped.
 - .2 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

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3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 01.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 11 01.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 11 01.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

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

END OF SECTION

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PART 1 - GENERAL

1.1 REFERENCES

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

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 00.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Certificates:
 - .1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit 3 copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet standards and regulations.
 - .1 Production certificate of origin must be submitted to Departmental Representative for approval.
 - .2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.
 - .3 Any work of manufacturing, assembly or installation to begin only after acceptance of production certificate of origin by Departmental Representative. Unless complying with this requirement, Departmental Representative reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.
 - .4 Production certificate of origin must contain:
 - .1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate.
 - .2 Licensed dealer's name and address and person of distributor responsible for Contractor's account.
 - .3 Contractor's name and address and person responsible for project.
 - .4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate.

.5 Name and address of building where circuit breakers will be installed:

- .1 Project title.
- .2 End user's reference number.
- .3 List of circuit breakers.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 11 01 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store circuit breakers indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect circuit breakers from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 BREAKERS GENERAL

- .1 Moulded-case circuit breakers to CSA C22.2 No. 5
- .2 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
 - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers with interchangeable trips as indicated.
- .6 Circuit breakers to have minimum 22 kA symmetrical rms interrupting capacity rating.

2.2 THERMAL MAGNETIC BREAKERS DESIGN A

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

PART 3 - EXECUTION

3.1 EXAMINATION

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

3.2 INSTALLATION

- .1 Install circuit breakers as indicated.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 11 01.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 11 01.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 11.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 01 11 01 - General Instructions Minor Works.
- .2 Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .3 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.2 SYSTEM DESCRIPTION

- .1 Empty telecommunications raceways system consists of outlet boxes, cover plates, conduits, cabletroughs, pull boxes, sleeves and caps, fish wires, service fittings.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 11 01 - Construction/Demolition Waste Management And Disposal .
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal: paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal conduit and wiring materials from landfill to metal recycling facility as approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Conduits: in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings .
- .2 Cabletroughs: type, in accordance with Section 26 05 36 - Cable Trays for Electrical Systems .

- .3 Junction boxes, cabinets type E T: in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .4 Outlet boxes, conduit boxes size, and fittings: in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets.
- .5 Fish wire: polypropylene type.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install empty raceway system, including distribution system, fish wire, terminal cabinets, outlet boxes, floor boxes, pull boxes, cover plates, conduit, sleeves and caps, cabletroughs, service poles, miscellaneous and positioning material to constitute complete system.

3.2 WIRE BASKET CABLE TRAY

- .1 Wire basket to be installed in accordance with all appropriate NEMA VE-2 2000, OESC, and NFPA standards
- .2 Wire basket tray to be supported on 10' (3 m) centres with centre rod hangers as manufactured by tray manufacturer. Trapeze/centre rod hangers to be hung with 1/4" x 3/8" (6.35 mm or 9.53 mm) threaded rod.
- .3 All connections to be checked to make sure they are correctly tightened and to ensure that all tray sections and fittings are electrically continuous and bonded with adjacent systems in accordance with the Canadian Electrical Code for proper grounding.
- .4 All systems to be installed complete. Work to include fastening all trays to adjacent wiring systems to install a complete system as indicated on the electrical and/or communication drawings and in the applicable specifications.

END OF SECTION



APPENDIX "B"

TERMS OF PAYMENT

TP1 Amount Payable – General

- 1.1. Subject to any other provisions of the contract, Her Majesty shall pay the Contractor, at the times and in the manner hereinafter set out, the amount by which
- 1.1.1. the aggregate of the amount described in TP2 exceeds
- 1.1.2. the aggregate of the amount described in TP3
- and the Contractor shall accept that amount as payment in full satisfaction for everything furnished and done by him in respect of the work to which the payment relates.

TP2 Amounts Payable to the Contractor

- 2.1 The amounts referred to in TP1.1.1 are the aggregate of
- 2.1.1 the amounts referred to in the Articles of Agreement, and
- 2.1.2 the amounts, if any, that are payable to the Contractor pursuant to the General Conditions.

TP3 Amounts Payable to Her Majesty

- 3.1 The amounts referred to in TP1.1.2 are the aggregate of the amounts, if any, that the Contractor is liable to pay Her Majesty pursuant to the contract.
- 3.2 When making any payment to the Contractor, the failure of Her Majesty to deduct an amount referred to in TP3.1 from an amount referred to in TP2 shall not constitute a waiver of the right to do so, or an admission of lack of entitlement to do so in any subsequent payment to the Contractor.

TP4 Time of Payment

- 4.1 In these Terms of Payment :
- 4.1.1 The "payment period" means a period of 30 consecutive days or such other longer period as is agreed between the Contractor and the Engineer.
- 4.1.2 An amount is "due and payable" when it is due and payable by Her Majesty to the Contractor according to TP4.4, TP4.7 or TP4.10.
- 4.1.3 An amount is overdue when it is unpaid on the 1st day following the day upon which it is due and payable.
- 4.1.4 The "date of payment" means the date of the negotiable instrument of an amount due and payable by the Receiver General for Canada and given for payment.
- 4.1.5 The "Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the opening of business on the date of payment.
- 4.2 The Contractor shall, on the expiration of a payment period, deliver to the Engineer in respect of that payment period a written progress claim that fully describes any part of the work that has been completed, and any material that was delivered to the work site but not incorporated into the work, during that payment period.



- 4.3 The Engineer shall, not later than 10 days after receipt by him of a progress claim referred to in TP4.2 :
- 4.3.1 inspect the part of the work and the material described in the progress claim; and
 - 4.3.2 issue a progress report, a copy of which the Engineer will give to the Contractor, that indicates the value of the part of the work and the material described in the progress claim that, in the opinion of the Engineer;
 - 4.3.2.1 is in accordance with the contract; and
 - 4.3.2.2 was not included in any other progress report relating to the contract.
- 4.4 Subject to TP1 and TP4.5 Her Majesty shall, not later than 30 days after the receipt by the Engineer of a progress report claim referred to in TP4.2, pay the Contractor :
- 4.4.1 an amount that is equal to 95 % of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has been furnished by the Contractor, or
 - 4.4.2 an amount that is equal to 90 % of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has not been furnished by the Contractor :
- 4.5 It is a condition precedent to Her Majesty's obligation under TP4.4 that the Contractor has made and delivered to the Engineer:
- 4.5.1 a statutory declaration described in TP4.6 in respect of a progress claim referred to in TP4.2;
 - 4.5.2 in the case of the Contractor's first progress claim, a construction schedule in accordance with the relevant sections of the Specifications; and
 - 4.5.3 if the requirement for a schedule is specified, an update of the said schedule at the times identified in the relevant sections of the Specifications.
- 4.6 A statutory declaration referred to in TP4.5 shall contain a deposition by the Contractor that, up to the date of the Contractor's progress claim, the Contractor has complied with all its lawful obligations with respect to the Labour Conditions, and that all lawful obligations of the Contractor to subcontractors and suppliers of material in respect of the work under the contract have been fully discharged.
- 4.7 Subject to TP1 and TP4.8, Her Majesty shall, not later than 30 days after the date of issue of an Interim Certificate of Completion referred to in GC44.2, pay the Contractor the amount referred to in TP1 less the aggregate of:
- 4.7.1 the sum of all payments that were made pursuant to TP4.4;
 - 4.7.2 an amount that is equal to the Engineer's estimate of the cost to Her Majesty of rectifying defects described in the Interim Certificate of Completion; and
 - 4.7.3 an amount that is equal to the Engineer's estimate of the cost to Her Majesty of completing the parts of the work described in the Interim Certificate of Completion other than the defects referred to in TP4.
- 4.8 It is a condition precedent to Her Majesty's obligation under TP4.7 that the Contractor has made and delivered to the Engineer :
- 4.8.1 a statutory declaration described in TP4.9 in respect of an Interim Certificate of Completion referred to in GC44.2; and
 - 4.8.2 if so specified in the relevant sections of the Specifications, an update of the construction schedule referred to in TP4.5.2 and the updated schedule shall, in addition to the specified requirements, clearly show a detailed timetable that is acceptable to the Engineer for the completion of any unfinished work and the correction of all listed defects.
- 4.9 A statutory declaration referred to in TP4.8 shall contain a deposition by the Contractor that up to the date of the Interim Certificate of Completion the Contractor has:
- 4.9.1 complied with all of the Contractor's lawful obligations with respect to the Labour



Conditions;

- 4.9.2 discharged all of the Contractor's lawful obligations to the subcontractors and suppliers of material in respect of the work under the contract; and
- 4.9.3 discharged the Contractor's lawful obligations referred to in TP4.6.
- 4.10 Subject to TP1 and TP4.11, Her Majesty shall, not later than 60 days after the date of issue of a Final Certificate of Completion referred to in GC GC44.1, pay the Contractor the amount referred to in TP1 less the aggregate of :
 - 4.10.1 the sum of all payments that were made pursuant to TP4.4; and
 - 4.10.2 the sum of all payments that were made pursuant to TP4.7.
- 4.11 It is a condition precedent to Her Majesty's obligation under TP4.10 that the Contractor has made and delivered a statutory declaration described in TP4.12 to the Engineer.
- 4.12 A statutory declaration referred to in TP4.11 shall, in addition to the depositions described in TP4.9, contain a disposition by the Contractor that all of the Contractor's lawful obligations and any lawful claims against the Contractor that arose out of the performance of the contract have been discharged and satisfied.

TP5 Progress Report and Payment Thereunder Not Binding on Her Majesty

- 5.1 Neither a progress report referred to in TP4.3 nor any payment made by Her Majesty pursuant to these Terms of Payment shall be construed as an admission by Her Majesty that the work material or any part thereof is complete, is satisfactory or is in accordance with the contract.

TP6 Delay in Making Payment

- 6.1 Notwithstanding TP5 any delay by Her Majesty in making any payment when it is due pursuant to these Terms of Payment shall not be a breach of the contract by Her Majesty.
- 6.2 Her Majesty shall pay, without demand from the Contractor, simple interest at the Bank Rate plus 1 % centum on any amount which is overdue pursuant to TP4.1.3, and the interest shall apply from and include the day such amount became overdue until the day prior to the date of payment except that :
 - 6.2.1 interest shall not be payable or paid unless the amount referred to in TP6.2 has been overdue for more than 15 days following
 - 6.2.1.1 the date the said amount became due and payable; or
 - 6.2.1.2 the receipt by the Engineer of the Statutory Declaration referred to in TP4.5, TP4.8 or TP4.11;
 - whichever is the later; and
 - 6.2.2 interest shall not be payable or paid on overdue advance payments if any.

TP7 Right of Set-off

- 7.1 Without limiting any right of set-off or deduction given or implied by law or elsewhere in the contract, Her Majesty may set off any amount payable to Her Majesty by the Contractor under this contract or under any current contract against any amount payable to the Contractor under this contract.
- 7.2 For the purposes of TP7.1, "current contract" means a contract between Her Majesty and the Contractor :
 - 7.2.1 under which the Contractor has an undischarged obligation to perform or supply work, labour or material; or
 - 7.2.2 in respect of which Her Majesty has, since the date on which the Articles of Agreement were made,



exercised any right to take the work that is the subject of the contract out of the Contractor's hands.

TP8 Payment in Event of Termination

- 8.1 If the contract is terminated pursuant to GC41, Her Majesty shall pay the Contractor any amount that is lawfully due and payable to the Contractor as soon as is practicable under the circumstances.

TP9 Interest in Settled Claims

- 9.1 Her Majesty shall pay to the Contractor simple interest on the amount of a settled claim at an average Bank Rate plus 1 ¼ per centum from the date the settled claim was outstanding until the day prior to the date of payment.
- 9.2 For the purposes of TP9.1:
- 9.2.1 a claim is deemed to have been settled when an agreement in writing is signed by the Engineer and the Contractor setting out the amount of the claim to be paid by Her Majesty and the items of work for which the said amount is to be paid;
 - 9.2.2 an "average Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the end of each calendar month averaged over the period the settled claim was outstanding;
 - 9.2.3 a settled claim is deemed to be outstanding from the day immediately following the date the said claim would have been due and payable under the contract had it not been disputed.
- 9.3 For the purposes of TP9 a claim means a disputed amount subject to negotiation between Her Majesty and the Contractor under the contract.



APPENDIX "C"

GENERAL CONDITIONS

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GC1 Interpretation

1.1 In the contract

- 1.1.1 Where reference is made to a part of the contract by means of numbers preceded by letters, the reference shall be construed to be a reference to the particular part of the contract that is identified by that combination of letters and numbers and to any other part of the contract referred to therein :
- 1.1.2 “contract” means the contract documents referred to in the Articles of Agreement;
- 1.1.3 “contract security” means any security given by the Contractor to Her Majesty in accordance with the contract;
- 1.1.4 “Engineer” means the officer or employee of Her Majesty who is designated pursuant to the Articles of Agreement and includes a person specially authorized by him to perform, on his behalf, any of his functions under the contract and is so designated in writing to the Contractor.
- 1.1.5 “material” includes all commodities, articles and things required to be furnished by or for the Contractor under the contract for incorporation into the work;
- 1.1.6 “Minister” includes a person acting for, or if the office is vacant, in place of the Minister and his successors in the Office, and his or their lawful deputy and any of his or their representatives appointed for the purposes of the contract;
- 1.1.7 “person” includes, unless the context otherwise requires, a partnership, proprietorship, firm, joint venture, consortium and a corporation;
- 1.1.8 “plant” includes all animals, tools, implements, machinery, vehicles, buildings, structures, equipment and commodities, articles and things other than material, that are necessary for the due performance of the contract;
- 1.1.9 “subcontractor” means a person to whom the Contractor has, subject to GC4, subcontracted the whole or any part of the work;
- 1.1.10 “superintendent” means the employee of the Contractor who is designated by the Contractor to act pursuant to GC19;
- 1.1.11 “work” includes, subject only to any express stipulation in the contract to the contrary, everything that is necessary to be done, furnished or delivered by the Contractor to perform the contract.

1.2 The headings in the contract documents, other than in the Plans and Specifications, form no part of the contract but are inserted for convenience of reference only.

1.3 In interpreting the contract, in the event of discrepancies or conflicts between anything in the Plans and Specifications and the General Conditions, the General Conditions govern.

1.4 In interpreting the Plans and Specifications, in the event of discrepancies or conflicts between :

- 1.4.1 the Plans and Specifications, the Specifications govern;
- 1.4.2 the Plans, the Plans drawn with the largest scale govern; and
- 1.4.3 figured dimensions and scaled dimensions, the figured dimensions govern.

GC2 Successors and Assigns

2.1 The contract shall inure to the benefit of and be binding upon the parties hereto and their lawful heirs, executors, administrators, successors and assigns.



GC3 Assignment of Contract

- 3.1 The contract may not be assigned by the Contractor, either in whole or part, without the written consent of the Minister.

GC4 Subcontracting by Contractor

- 4.1 Subject to this General condition, the Contractor may subcontract any part of the work.
- 4.2 The Contractor shall notify the Engineer in writing of this intention to subcontract.
- 4.3 A notification referred to in GC4.2 shall identify the part of the work, and the subcontractor with whom it is intended to subcontract.
- 4.4 The Engineer may object to the intended subcontracting by notifying the Contractor in writing within 6 days of receipt by the Engineer of a notification referred to in GC4.2.
- 4.5 If the Engineer objects to a subcontracting pursuant to GC4.2 the Contractor shall not enter into the intended subcontract.
- 4.6 The Contractor shall not, without the written consent of the Engineer, change a subcontractor who has been engaged by him in accordance with this General Conditions.
- 4.7 Every subcontract entered into by the Contractor shall adopt all of the terms and conditions of the contract that are of general application.
- 4.8 Neither a subcontracting nor the Engineer's consent to a subcontracting by the Contractor shall be construed to relieve the Contractor from any obligation under the contract or to impose any liability upon Her Majesty.

GC5 Amendments

- 5.1 No amendment or change in any of the provisions of the contract shall have any force or effect until it is reduced in writing.

GC6 No implied Obligations

- 6.1 No implied terms or obligations of any kind by or on behalf of Her Majesty shall arise from anything in the contract and the express covenants and agreements therein contained and made by Her Majesty are the only covenants and agreements upon which any rights against Her Majesty are to be founded.
- 6.2 The contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work that was made prior to the date of the contract.

GC7 Time of Essence

- 7.1 Time is of the essence of the contract.

GC8 Indemnification by Contractor

- 8.1 The Contractor shall identify and save Her Majesty harmless from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings by whomever made, brought or prosecuted and in any
- 8.2 manner bases upon, arising out of, related to, occasioned by or attributable to the activities of the Contractor, his servants, agents, subcontractors and sub-subcontractors in performing the work including and infringement or an alleged infringement of a patent of invention or any other kind of intellectual property.
- 8.3 For the purposes of GC8.1, "activities" includes any act improperly carried out, any omission to carry out an act and any delay in carrying out an act.



GC9 Indemnification by Her Majesty

- 9.1 Her Majesty shall, subject to the Crown Liability Act, the Patent Act, and any other law that affects Her Majesty's rights, powers, privileges or obligations, indemnify and save the Contractor harmless from and against all claims, demands, losses, costs, damage, actions, suits or proceedings arising out of his activities under the contract that are directly attributable to :
- 9.1.1 lack of or a defect in Her Majesty's title to the work site whether real or alleged; or
 - 9.1.2 an infringement or an alleged infringement by the Contractor of any patent of invention or any other kind of intellectual property occurring while the Contractor was performing any act of the purposes of the contract employing a model, plan or design or any other thing related to the work that was supplied by Her Majesty to the Contractor.

GC10 Members of House of Commons Not to Benefit

- 10.1 As required by the *Parliament of Canada Act*, it is an express condition of the contract that no member of the House of Commons shall be admitted to any share or part of the contract or to any benefit arising therefrom.

GC11 Notices

- 11.1 Any notice, consent, order, decision, direction or other communication, other than a notice referred to in GC11.4, that may be given to the Contractor pursuant to the contract may be given in any manner.
- 11.2 Any notice, consent, order, decision, direction or other communication required to be given in writing to any party pursuant to the contract shall, subject to GC11.4, be deemed to have been effectively given
- 11.2.1 to the Contractor, if delivered personally to the Contractor or the Contractor's superintendent, or forwarded by mail, telex or facsimile to the Contractor at the address set out in A4.1 or
 - 11.2.2 to Her Majesty, if delivered personally to the Engineer, or forwarded by mail, telex or facsimile to the Engineer at the address set out in A1.2.1.
- 11.3 Any such notice, consent, order, decision, direction or other communication given in accordance with GC11.2 shall be deemed to have been received by either party
- 11.3.1 if delivered personally, on the day that it was delivered
 - 11.3.2 if forwarded by mail, on the earlier of the day it was received and the sixth day after it was mailed, and
 - 11.3.3 if forwarded by telex or facsimile, 24 hours after it was transmitted.
- 11.4. A notice given under GC38.1, GC40 and GC41, if delivered personally, shall be delivered to the Contractor if the Contractor is doing business as a sole proprietor or, if the Contractor is a partnership or corporation, to an officer thereof

GC12 Material, Plant and Real Property Supplied by Her Majesty

- 12.1 Subject to GC12.2, the Contractor is liable to Her Majesty for any loss of or damage to material, plant or real property that is supplied or placed in the care, custody and control of the Contractor by Her Majesty for use in connection with the contract, whether or not that loss or damage is attributable to causes beyond the Contractor's control.
- 12.2 The Contractor is not liable to Her Majesty for any loss or damage to material, plant or real property referred to in GC12.1 if that loss or damage results from and is directly attributable to reasonable wear and tear.
- 12.3 The Contractor shall not use any material, plant or real property referred to in GC12.1 except for the purpose of performing this contract.



- 12.4 When the Contractor fails to make good any loss or damage for which he is liable under GC12.1 within a reasonable time after being required to do so by the Engineer, the Engineer may cause the loss or damage to be made good at the Contractor's expense, and the Contractor shall thereupon be liable to Her Majesty for the cost thereof and shall, on demand, pay to Her Majesty an amount equal to that cost.
- 12.5 The Contractor shall keep such records of all material, plant and real property referred to in GC12.1 as the Engineer from time to time requires and shall satisfy the Engineer, when requested, that such material, plant and real property are at the place and in the condition in which they ought to be.

GC13 Material, Plant and Real Property Become Property of Her Majesty

- 13.1 Subject to GC14.7 all material and plant and the interest of the Contractor in all real property, licenses, powers and privileges purchased, used or consumed by the Contractor for the contract shall, after the time of their purchase, use or consumption be the property of Her Majesty for the purposes of the work and they shall continue to be the property of Her Majesty,
- 13.1.1 in the case of material, until the Engineer indicates that he is satisfied that it will not be required for the work, and
- 13.1.2 in the case of plant, real property, licenses, powers and privileges, until the Engineer indicates that he is satisfied that the interest vested in Her Majesty therein is no longer required for the purposes of the work.
- 13.2 Material or plant that is the property of V virtue of GC13.1 shall not be taken away from the work site or used or disposed of except for the purposes of the work without the written consent of the Engineer.
- 13.3 Her Majesty is not liable for loss of or damage from any cause to the material or plant referred to in GC13.1 and the Contractor is liable for such loss or damage notwithstanding and the material or plant is the property of Her Majesty.

GC14 Permits and Taxes Payable

- 14.1 The Contractor shall, within 30 days after the date of the contract, tender to a municipal authority an amount equal to all fees and charges that would be lawfully payable to that municipal authority in respect of building permits as if the work were being performed for a person other than Her Majesty.
- 14.2 Within 10 days of making a tender pursuant to GC14.1, the Contractor shall notify the Engineer of his action and of the amount tendered and whether or not the municipal authority has accepted that amount.
- 14.3 If the municipal authority does not accept the amount tendered pursuant to GC14.1 the Contractor shall pay that amount to Her Majesty within 6 days after the time stipulated in GC14.2.
- 14.4 For the purposes of GC14.1 to GC14.3 "municipal authority" means any authority that would have jurisdiction respecting permission to perform the work if the owner were not Her Majesty.
- 14.5 Notwithstanding the residency of the Contractor, the Contractor shall pay any applicable tax arising from or related to the performance of the work under the Contractor.
- 14.6 In accordance with the Statutory Declaration referred to in TP4.9, a Contractor who has neither residence nor place of business in the province in which work under the contract is being performed shall provide Her Majesty with proof of registration with the provincial sales tax authorities in the said province.
- 14.7 For the purpose of the payment of any applicable tax or the furnishing of security for the payment of any applicable tax arising from or related to the performance of the work under the contract, the Contractor shall, notwithstanding the fact that all material, plant and interest of the Contractor in all real property, licenses,



powers and privileges, have become the property of Her Majesty after the time of purchase, the liable, as a user of consumer, for the payment or for the furnishing of security for the payment of any applicable tax payable, at the time of the use or consumption of that material, plant or interest of the Contractor in accordance with the relevant legislation.

GC15 Performance of Work under Direction of Engineer

15.1 The Contractor shall:

- 15.1.1 permit the Engineer to have access to the work and its site of all times during the performance of the contract;
- 15.1.2 furnish the Engineer with such information respecting the performance of the contract as he may require; and
- 15.1.3 give the Engineer every possible assistance to enable the Engineer to carry out his duty to see that the work is performed in accordance with the contract and to carry out any other duties and exercise any powers specially imposed or conferred on the Engineer under the contract.

GC16 Cooperation with Other Contractors

16.1 Where, in the opinion of the Engineer, it is necessary that other contractors or workers with or without plant and material be sent onto the work or its site, the Contractor shall, to the satisfaction of the Engineer, allow them access and cooperate with them in the carrying out of their duties and obligations.

16.2 If

- 16.2.1 the sending onto the work or its site of other contractors or workers pursuant to GC16.1 could not have been reasonably foreseen or anticipated by the Contractor when entering into the contract, and
- 16.2.2 the Contractor incurs, in the opinion of the Engineer, extra expense in complying with GC16.1, and
- 16.2.3 the Contractor has given the Engineer written notice of his claim for the extra expense referred to in GC16.2.2 within 30 days of the date that the other contractors or workers were sent onto the work or its site.

Her Majesty shall pay the Contractor the cost, calculated in accordance with GC48 to GC50, of the extra labour, plant and material that was necessarily incurred.

GC17 Examination of Work

17.1 If, at any time after the commencement of the work but prior to the expiry of the warranty or guarantee period, the Engineer has reason to believe that the work or any part thereof has not been performed in accordance with the contract, the Engineer may have that work examined by an expert of his choice.

17.2 If, as a result of an examination of the work referred to in GC17.1, it is established that the work was not performed in accordance with the contract, then, in addition to and without limiting or otherwise affecting any of Her Majesty's rights and remedies under the contract either at law or in equity, the Contractor shall pay Her Majesty, on demand, all reasonable costs and expenses that were incurred by Her Majesty in having that examination performed.

GC18 Clearing of Site

18.1 The Contractor shall maintain the work and its site in a tidy condition and free from the accumulation of waste material and debris, in accordance with any directions of the Engineer.

18.2 Before the issue of an interim certificate referred to in GC44.2, the Contractor shall remove all the plant and material not required for the performance of the remaining work, and all waste material and other debris, and



shall cause the work and its site to be clean and suitable for occupancy by Her Majesty's servants, unless otherwise stipulated in the contract.

- 18.3 Before the issue of a final certificate referred to in GC44.1, the Contractor shall remove from the work and its site all of the surplus plant and material and any waste material and other debris.
- 18.4 The Contractor's obligations described in GC18.1 to GC18.3 do not extend to waste material and other debris caused by Her Majesty's servants or contractors and workers referred to in GC16.1.

GC19 Contractor's Superintendent

- 19.1 The Contractor shall, forthwith upon the award of the contract, designate a superintendent.
- 19.2 The Contractor shall forthwith notify the Engineer of the name, address and telephone number of a superintendent designated pursuant to GC19.1
- 19.3 A superintendent designated pursuant to GC19.1 shall be in full charge of the operations of the Contractor in the performance of the work and is authorized to accept any notice, consent, order, direction, decision or other communication on behalf of the Contractor that may be given to the superintendent under the contract.
- 19.4 The Contractor shall, until the work has been completed, keep a competent superintendent at the work site during work hours.
- 19.5 The Contractor shall, upon the request of the Engineer, remove any superintendent who, in the opinion of the Engineer, is incompetent or has been conducting himself improperly and shall forthwith designate another superintendent who is acceptable to the Engineer.
- 19.6 Subject to GC19.5, the Contractor shall not substitute a superintendent without the written consent of the Engineer.
- 19.7 A breach by the Contractor of GC19.6 entitles the Engineer to refuse to issue any certificate referred to in GC44 until the superintendent has returned to the work site or another superintendent who is acceptable to the Engineer has been substituted.

GC20 National Security

- 20.1 If the Minister is of the opinion that the work is of a class or kind that involves the national security he may order the Contractor :
- 20.1.1 to provide him with any information concerning persons employed or to be employed by him for purposes of the contract; and
- 20.1.2 to remove any person from the work and its site if, in the opinion of the Minister, that person may be a risk to the national security.
- 20.2 The Contractor shall, in all contracts with persons who are to be employed in the performance of the contract, make provisions for his performance of any obligation that may be imposed upon him under GC19 to GC21.
- 20.3 The Contractor shall comply with an order of the Minister under GC20.1.

GC21 Unsuitable Workers

- 21.1 The Contractor shall, upon the request of the Engineer, remove any person employed by him for purposes of the contract who, in the opinion of the Engineer, is incompetent or has conducted himself improperly, and the Contractor shall not permit a person who has been removed to return to the work site.



GC22 Increased or Decreased Costs

- 22.1 The amount set out in the Articles of Agreement shall not be increased or decreased by reason of any increase or decrease in the cost of the work that is brought about by an increase or decrease in the cost of labour, plant or material or any wage adjustment arising pursuant to the Labour Conditions.
- 22.2 Notwithstanding GC22.1 and GC35, an amount set out in the Articles of Agreement shall be adjusted in the manner provided in GC22.3, if any change in a tax imposed under the *Excise Act*, the *Excise Tax Act*, the *Old Age Security Act*, the *Customs Act*, the *Customs Tariff* or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property.
- 22.2.1 occurs after the date of the submission by the Contractor of his tender for the contract,
- 22.2.2 applies to material, and
- 22.2.3 affects the cost to the Contractor of that material.
- 22.3 If a change referred to in GC22.2 occurs, the appropriate amount set out in the Articles of Agreement shall be increased or decreased by an amount equal to the amount that is established by an examination of the relevant records of the Contractor referred to in GCS1 to be the increase or decrease in the cost incurred that is directly attributable to that change.
- 22.4 For the purpose of GC22.2, where a tax is changed after the date of submission of the tender but public notice of the change has been given by the Minister of Finance before that date, the change shall be deemed to have occurred before the date of submission of the tender.

GC23 Canadian Labour and Material

- 23.1 The Contractor shall use Canadian labour and material in the performance of the work to the full extent to which they are procurable, consistent with proper economy and the expeditious carrying out of the work.
- 23.2 Subject to GC23.1, the Contractor shall, in the performance of the work, employ labour from the locality where the work is being performed to the extent to which it is available, and shall use the offices of the Canada Employment Centers for the recruitment of workers wherever practicable.
- 23.3 Subject to GC23.1 and GC23.2, the Contractor shall, in the performance of the work, employ a reasonable proportion of persons who have been on active service with the armed forces of Canada and have been honorably discharged therefrom.

GC24 Protection of Work and Documents

- 24.1 The Contractor shall guard or otherwise protect the work and its site, and protect the contract, specifications, plans, drawings, information, material plants and real property, whether or not they are supplied by Her Majesty to the Contractor, against loss or damage from any cause, and he shall not use, issue, disclose or dispose of them without the written consent of the Minister, except as maybe essential for the performance of the work.
- 24.2 If any document or information given or disclosed to the Contractor is assigned a security rating by the person who gave or disclosed it, the Contractor shall take all measures directed by the Engineer to be taken to ensure the maintenance of the degree of security that is ascribed to that rating.
- 24.3 The Contractor shall provide all facilities necessary for the purpose of maintaining security, and shall assist any person authorized by the Minister to inspect or to take security measures in respect of the work and its site.
- 24.4 The Engineer may direct the Contractor to do such things and to perform such additional work as the Engineer considers reasonable and necessary to ensure compliance with or to remedy a breach of GC24.1 to GC24.3.



GC25 Public Ceremonies and Signs

- 25.1 The Contractor shall not permit any public ceremony in connection with the work without the prior consent of the Minister.
- 25.2 The Contractor shall not erect or permit the erection of any sign or advertising on the work or its site without prior consent of the Engineer.

GC26 Precautions Against Damage, Infringement of Rights, Fire and Other Hazard

- 26.1 The Contractor shall, at his own expense, do whatever is necessary to ensure that :
- 26.1.1 no person, property, right easement or privilege is injured, damages or infringed by reasons of the Contractor's activities in performing the contract;
 - 26.1.2 pedestrian and other traffic on any public or private road or waterway is not unduly impeded, interrupted or endangered by the performance or existence of the work or plant;
 - 26.1.3 fire hazard in or about the work or its site are eliminated and, subject to any direction that may be given by the Engineer, any fire is promptly extinguished;
 - 26.1.4 the health and safety of all persons employed in the performance of the work is not endangered by the method or means of its performance;
 - 26.1.5 adequate medical services are available to all persons employed on the work or its site at all times during the performance of the work;
 - 26.1.6 adequate sanitation measures are taken in respect of the work and its site; and
 - 26.1.7 all stakes, buoys and marks placed on the work or its site by or under the authority of the Engineer are protected and are not removed, defaced, altered or destroyed.
- 26.2 The Engineer may direct the Contractor to do such things and to perform such additional work as the Engineer considers reasonable and necessary to ensure compliance with or to remedy a breach of GC26.1.
- 26.3 The Contractor shall, at his own expense, comply with a direction of the Engineer made under GC26.2.

GC27 Insurance

- 27.1 The Contractor shall, at his own expense, obtain and maintain insurance contracts in respect of the work and shall provide evidence thereof to the Engineer in accordance with the requirements of the Insurance Conditions in Appendix "E".
- 27.2 The insurance contracts referred to in GC27.1 shall:
- 27.2.1 be in a form, of the nature, in the amounts, for the periods and containing the terms and conditions specified in Insurance Conditions in Appendix "E".and
 - 27.2.2 provide for the payment of claims under such insurance contracts in accordance with GC28.

GC28 Insurance Proceeds

- 28.1 In the case of a claim payable under a Builders Risk/Installation (All Risks) insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid directly to Her Majesty, and
- 28.1.1 the monies so paid shall be held by Her Majesty for the purposes of the contract, or
 - 28.1.2 if Her Majesty elects, shall be retained by Her Majesty, in which event they vest in Her Majesty absolutely.



- 28.2 In the case of a claim payable under a General Liability insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid by the insurer directly to the claimant.
- 28.3 If an election is made pursuant to GC28.1, the Minister may cause an audit to be made of the accounts of the Contractor and of Her Majesty in respect of the part of the work that was lost, damaged or destroyed for the purpose of establishing the difference, if any, between
- 28.3.1 the aggregate of the amount of the loss or damage suffered or sustained by Her Majesty, including any costs incurred in respect of the clearing and cleaning of the work and its site and any other amount that is payable by the Contractor to Her Majesty under the contract, minus any monies retained pursuant to GC28.1.2, and
- 28.3.2 the aggregate of the amounts payable by Her Majesty to the Contractor pursuant to the contract up to the date of the loss or damage.
- 28.4 A difference that is established pursuant to GC28.3 shall be paid forthwith by the party who is determined by the audit to be the debtor to the party who is determined by the audit to be the creditor.
- 28.5 When payment of a deficiency has been made pursuant to GC28.4, all rights and obligations of Her Majesty and the Contractor under the contract shall, with respect only to the part of the work that was the subject of the audit referred to in GC28.3, be deemed to have been expended and discharged.
- 28.6 If an election is not made pursuant to GC28.1.2 the Contractor shall, subject to GC28.7, clear and clean the work and its site and restore and replace the part of the work that was lost, damaged or destroyed at his own expense as if that part of the work had not yet been performed.
- 28.7 When the Contractor clears and cleans the work and its site and restores and replaces the work referred to in GC28.6, Her Majesty shall pay him out of the monies referred to in GC28.1 so far as they will thereunto extend.
- 28.8 Subject to GC28.7, payment by Her Majesty pursuant to GC28.7 shall be made in accordance with the contract but the amount of each payment shall be 100% of the amount claimed notwithstanding TP4.4.1 and TP4.4.2.

GC29 Contract Security

- 29.1 The Contractor shall obtain and deliver contract security to the Engineer in accordance with the provisions of the Contract Security Conditions.
- 29.2 If the whole or a part of the contract security referred to in GC29.1 is in the form of a security deposit, it shall be held and disposed of in accordance with GC43 and GC45.
- 29.3 If a part of the contract security referred to in GC29.1 is in the form of a labour and material payment bond, the Contractor shall post a copy of that bond on the work site.

GC30 Changes in the Work

- 30.1 Subject to GC5, the Engineer may, at any time before he issues his Final Certificate of Completion,
- 30.1.1 order work or material in addition to that provided for in the Plans and Specifications, and
- 30.1.2 delete or change the dimensions, character, quality, quality, description, location or position of the whole or any part of the work or material provided for in the Plans and Specifications or in any order made pursuant to GC30.1.1, if that additional work or material, deletion, or change is, in his opinion, consistent with the general intent of the original contract
- 30.2 The Contractor shall perform the work in accordance with such orders, deletions and changes that are made by the Engineer pursuant to GC30.1 from time to time as if they had appeared in and been part of the Plans and Specifications.



- 30.3 The Engineer shall determine whether or not anything done or omitted by the Contractor pursuant to an order, deletion or change referred to in GC30.1 increased or decreased the cost of the work to the Contractor.
- 30.4 If the Engineer determines pursuant to GC30.3 that the cost of the work to the Contractor has been increased, Her Majesty shall pay the Contractor the increased cost that the Contractor necessarily incurred for the additional work calculated in accordance with GC49 or GC50
- 30.5 If the Engineer determines pursuant to GC30.3 that the cost of the work to the Contractor has been decreased, Her Majesty shall reduce the amount payable to the Contractor under the contract by an amount equal to the decrease in the cost caused by the deletion or change referred to in GC30.1.2 and calculated in accordance with GC49.
- 30.6 GC30.3 to GC30.5 are applicable only to a contract or a portion of a contract for which a Fixed Price Arrangement is stipulated in the contract.
- 30.7 An order, deletion or change referred to in GC30.1 shall be in writing, signed by the Engineer and given to the Contractor in accordance with GC11.

31 Interpretation of Contract by Engineer

- 31.1 If, at the time before the Engineer has issued a Final Certificate of Completion referred to in GC44.1, any question arises between the parties about whether anything has been done as required by the contract or about what the Contractor is required by the contract to do, and, in particular but without limiting the generality of the foregoing, about
- 31.1.1 the meaning of anything in the Plans and Specifications,
 - 31.1.2 the meaning to be given to the Plans and Specifications in case of any error therein, omission therefrom, or obscurity or discrepancy in their wording or intention,
 - 31.1.3 whether or not the quality or quantity of any material or workmanship supplied or proposed to be supplied by the Contractor meets the requirements of the contract,
 - 31.1.4 whether or not the labour, plant or material provided by the Contractor for performing the work and carrying out the contract are adequate to ensure that the work will be performed in accordance with the contract and that the contract will be carried out in accordance with its terms,
 - 31.1.5 what quantity of any kind of work has been completed by the Contractor, or
 - 31.1.6 the timing and scheduling of the various phases of the performance of the work, the question shall be decided by the Engineer whose decision shall be final and conclusive in respect of the work.
- 31.2 The Contractor shall perform the work in accordance with any decisions of the Engineer that are made under GC31.1 and in accordance with any consequential directions given by the Engineer.

GC32 Warranty and Rectification of Defects in Work

- 32.1 Without restricting any warranty or guarantee implied or imposed by law or contained in the contract documents, the Contractor shall, at his own expense,
- 32.1.1 rectify and make good any defect or fault that appears in the work or comes to the attention of the Minister with respect to those parts of the work accepted in connection with the Interim Certificate of Completion referred to in GC44.2 within 12 months from the date of the Interim Certificate of Completion;
 - 32.1.2 rectify and make good any defect or fault that appears in or comes to the attention of the Minister in connection with those part of the work described in the Interim Certificate of Completion referred to in GC44.2 within 12 months from the date of the Final Certificate of Completion referred to in GC44.1.



- 32.2 The Engineer may direct the Contractor to rectify and make good any defect or fault referred to in GC32.1 or covered by any other expressed or implied warranty or guarantee.
- 32.3 A direction referred to in GC32.2 shall be in writing, may include a stipulation in respect of the time within which a defect or fault is required to be rectified and made good by the Contractor, and shall be given to the Contractor in accordance with GC11.
- 32.4 The Contractor shall rectify and make good any defect or fault described in a direction given pursuant to GC32.2 within the time stipulated therein.

GC33 Non-Compliance by Contractor

- 33.1 If the Contractor fails to comply with any decision or direction given by the Engineer pursuant to GC18, GC24, GC26, GC31 or GC32, the Engineer may employ such methods as he deems advisable to do that which the Contractor failed to do.
- 33.2 The Contractor shall, on demand, pay Her Majesty an amount that is equal to the aggregate of all costs, expenses and damage incurred or sustained by Her Majesty by reason of the Contractor's failure to comply with any decision or direction referred to in GC33.1, including the cost of any methods employed by the Engineer pursuant to GC33.1.

GC34 Protesting Engineer's Decisions

- 34.1 The Contractor may, within 10 days after the communication to him of any decision or direction referred to in GC30.3 or GC33.1, protest that decision or direction.
- 34.2 A protest referred to in GC34.1 shall be in writing, contain full reasons for the protest, be signed by the Contractor and be given to Her Majesty by delivery to the Engineer.
- 34.3 If the Contractor gives a protest pursuant to GC34.2, any compliance by the Contractor with the decision or direction that was protested shall not be construed as an admission by the Contractor of the correctness of that decision or direction, or prevent the Contractor from taking whatever action he considers appropriate in the circumstance.
- 34.4 The giving of a protest by the Contractor pursuant to GC34.2 shall not relieve him from complying with the decision or direction that is the subject of the protest.
- 34.5 Subject to GC34.6, the Contractor shall take any action referred to in GC34.3 within three months after the date that a Final Certificate of Completion is issued under GC44.1 and not afterwards.
- 34.6 The Contractor shall take any action referred to in GC34.3 resulting from a direction under GC32 within three months after the expiry of a warranty or guarantee period and not afterwards.
- 34.7 Subject to GC34.8, if Her Majesty determines that the Contractor's protest is justified, Her Majesty shall pay the Contractor the cost of the additional labour, plant and material necessarily incurred by the Contractor in carrying out the protested decision or direction.
- 34.8 Costs referred to in GC34.7 shall be calculated in accordance with GC48 to GC50.

GC35 Changes in Soil Conditions and Neglect or Delay by Her Majesty.

- 35.1 Subject to GC35.2 no payment, other than a payment that is expressly stipulated in the contract, shall be made by Her Majesty to the Contractor for any extra expense or any loss or damage incurred or sustained by the Contractor.
- 35.2 If the Contractor incurs or sustains any extra expense or any loss or damage that is directly attributable to :
- 35.2.1 a substantial difference between the information relating to soil conditions at the work site that is contained in the Plans and Specifications or other documents supplied to the Contractor for his use in preparing his tender or a reasonable assumption of fact based thereon made by the



Contractor, and the actual soil conditions encountered by the Contractor at the work site during the performance of the contract, or

- 35.2.2 any neglect or delay that occurs after the date of the contract on the part of Her Majesty in providing any information or in doing any act that the contract either expressly required Her Majesty to do or that would ordinarily be done by an owner in accordance with the usage of the trade, he shall, within 10 days of the date the actual soil conditions described in GC35.2.1 were encountered or the neglect or delay described in GC35.2.2 occurred, give the Engineer written notice of his intention to claim for that extra expense or that loss or damage.
- 35.3 When the Contractor has given a notice referred to in GC35.2, he shall give the Engineer a written claim for extra expense or loss or damage within 30 days of the date that a Final Certificate of Completion referred to in GC44.1 is issued and not afterwards.
- 35.4 A written claim referred to in GC35.3 shall contain a sufficient description of the facts and circumstances of the occurrence that is the subject of the claim to enable the Engineer to determine whether or not the claim is justified and the Contractor shall supply such further and other information for that purpose as the Engineer requires from time to time.
- 35.5 If the Engineer determines that a claim referred to in GC35.3 is justified, Her Majesty shall make an extra payment to the Contractor in an amount that is calculated in accordance with GC47 to GC50.
- 35.6 If, in the opinion of the Engineer, an occurrence described in GC35.2.1 results in a savings of expenditure by the Contractor in performing the contract, the amount set out in the Articles of Agreement shall, subject to GC35.7, be reduced by an amount that is equal to the saving.
- 35.7 The amount of the saving referred to in GC35.6 shall be determined in accordance with GC47 to GC49.
- 35.8 If the Contractor fails to give a notice referred to in GC35.2 and a claim referred to in GC35.3 within the times stipulated, an extra payment shall not be made to him in respect of the occurrence.

GC36 Extension to Time

- 36.1 Subject to GC36.2, the Engineer may, on the application of the Contractor made before the day fixed by the Articles of Agreement for completion of the work or before any other date previously fixed under this General Conditions, extend the time for its completion by fixing a new date if, in the opinion of the Engineer, causes beyond the control of the Contractor have delayed its completion.
- 36.2 An application referred to in GC36.1 shall be accompanied by the written consent of the bonding company whose bond forms part of the contract security.

GC37 Assessments and Damages for Late Completion

- 37.1 For the purposes of this General Conditions :
- 37.1.1 the work shall be deemed to be completed on the date that an Interim Certificate of Completion referred to in GC44.2 is issued, and
- 37.1.2 "period of delay" means the number of days commencing on the day fixed by the Articles of Agreement for completion of the work and ending on the day immediately preceding the day on which the work is completed but does not include any day within a period of extension granted pursuant to GC36.1, and any other day on which, in the opinion of the Engineer, completion of the work was delayed for reasons beyond the control of the Contractor.
- 37.2 If the Contractor does not complete the work by the day fixed for its completion by the Articles of Agreement but completes it thereafter, the Contractor shall pay Her Majesty an amount equal to the aggregate of
- 37.2.1 all salaries, wages and travelling expenses incurred by Her Majesty in respect of persons overseeing the performance of the work during the period of delay;



- 37.2.2 the costs incurred by Her Majesty as a result of the inability to use the completed work for the period of delay, and
- 37.2.3 all other expenses and damages incurred or sustained by Her Majesty during the period of delay as a result of the work not being completed by the day fixed for its completion.
- 37.3 The Minister may waive the right of Her Majesty to the whole or any part of the amount payable by the Contractor pursuant to GC37.2 if, in the opinion of the Minister, it is in the public interest to do so.

GC38 Taking the Work Out of the Contractor's Hands

- 38.1 The Minister may, at his sole discretion, by giving a notice in writing to the Contractor in accordance with GC11, take all or any part of the work out of the Contractor's hands, and may employ such means as he sees fit to have the work completed if the Contractor
 - 38.1.1 has not, within 6 days of the Minister or the Engineer giving notice to the Contractor in writing in accordance with GC11, remedied any delay in the commencement or any default in the diligent performance of the work to the satisfaction of the Engineer;
 - 38.1.2 has defaulted in the completion of any part of the work within the time fixed for its completion by the contract;
 - 38.1.3 has become insolvent or has committed an act of bankruptcy, and has neither made a proposal to its creditors nor filed a notice of intention to make such a proposal, pursuant to the Bankruptcy and Insolvency Act;
 - 38.1.4 has committed an act of bankruptcy;
 - 38.1.5 has abandoned the work;
 - 38.1.6 has made an assignment of the contract without the consent required by GC3.1; or
 - 38.1.7 has otherwise failed to observe or perform any of the provisions of the contract.
- 38.2 If the Contractor has become insolvent or has committed an act of bankruptcy, and has either made a proposal to its creditors or filed a notice of intention to make such a proposal, pursuant to the *Bankruptcy and Insolvency Act*, the Contractor shall immediately forward a copy of the proposal or the notice of intention to Her Majesty.
- 38.3 If the whole or any part of the work is taken out of the Contractor's hands pursuant to GC38.1,
 - 38.3.1 the Contractor's right to any further payment that is due or accruing due under the contract is, subject only to GC38.5, extinguished, and
 - 38.3.2 the Contractor is liable to pay Her Majesty, upon demand, an amount that is equal to the amount of all loss and damage incurred or sustained by Her Majesty in respect of the Contractor's failure to complete the work.
- 38.4 If the whole or any part of the work that is taken out of the Contractor's hands pursuant to GC38.1 is complete by Her Majesty, the Engineer shall determine the amount, if any, of the holdback or a progress claim that had accrued and was due prior to the date on which the work was taken out of the Contractor's hands and that is not required for the purposes of having the work performed or of compensating Her Majesty for any other loss or damage incurred or sustained by reason of the Contractor's default.
- 38.5 Her Majesty may pay the Contractor the amount determined not to be required pursuant to GC38.4.



GC39 Effect of Taking the Work Out of the Contractor's Hands

- 39.1 The taking of the work or any part thereof out of the Contractor's hands pursuant to GC38 does not operate so as to relieve or discharge him from any obligation under the contract or imposed upon him by law except the obligation to complete the performance of that part of the work that was taken out of his hands.
- 39.2 If the work or any part thereof is taken out of the Contractor's hands pursuant to GC38, all plant and material and the interest of the Contractor in all real property, licenses, powers and privileges acquired, used or provided by the Contractor under the contract shall continue to be the property of Her Majesty without compensation to the Contractor.
- 39.3 When the Engineer certifies that any plant, material, or any interest of the Contractor referred to in GC39.2 is no longer required for the purposes of the work, or that it is not in the interests of Her Majesty to retain that plant, material, or interest, it shall revert to the Contractor.

GC40 Suspension of Work by Minister

- 40.1 The Minister may, when in his opinion it is in the public interest to do so, require the Contractor to suspend performance of the work either for a specified or an unspecified period by giving notice of suspension in writing to the Contractor in accordance with GC11.
- 40.2 When a notice referred to in GC40.1 is received by the Contractor in accordance with GC11, he shall suspend all operations in respect of the work except those that, in the opinion of the Engineer, are necessary for the care and preservation of the work, plant and material.
- 40.3 The Contractor shall not, during a period of suspension, remove any part of the work, plant or material from its site without the consent of the Engineer.
- 40.4 If a period of suspension is 30 days or less, the Contractor shall, upon the expiration of the period, resume the performance of the work and has is entitled to be paid the extra cost, calculated in accordance with GC48 to GC50, of any labour, plant and material necessarily incurred by him as a result of the suspension.
- 40.5 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor agree that the performance of the work will be continued by the Contractor, the Contractor shall resume performance of the work subject to any terms and conditions agreed upon by the Minister and the Contractor.
- 40.6 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor do not agree that performance of the work will be continued by the Contractor or upon the terms and conditions under which the Contractor will continue the work, the notice of suspension shall be deemed to be a notice of termination pursuant to GC41.

GC41 Termination of Contractor

- 41.1 The minister may terminate the contract at any time by giving a notice of termination in writing to the Contractor in accordance with GC11.
- 41.2 When a notice referred to in GC41.1 is received by the Contractor in accordance with GC11, he shall subject to any conditions stipulated in the notice, forthwith cease all operations in performance of the contract.
- 41.3 If the contract is terminated pursuant to GC41.1, Her Majesty shall pay the Contractor, subject to GC41.4, an amount equal to
- 41.3.1 the cost to the Contractor of all labour, plant and material supplied by him under the contract up to the date of termination in respect of a contract or part thereof for which a Unit Price Agreement is stipulated in the contract, or
 - 41.3.2 the lesser of
 - 41.3.2.1 an amount, calculated in accordance with the Terms and Payment, that would have been payable to the Contractor had he completed the work, and



41.3.2.2 an amount that is determined to be due to the Contractor pursuant to GC49 in respect of a contract or part thereof for which is a Fixed Price Arrangement is stipulated in the contract,

less the aggregate of all amounts that were paid to the Contractor by Her Majesty and all amounts that are due to Her Majesty from the Contractor pursuant to the contract.

41.4 If Her Majesty and the Contractor are unable to agree about an amount referred to in GC41.3 that amount shall be determined by the method referred to in GC50.

GC42 Claims Against and Obligations of the Contractor or Subcontractor

42.1 Her Majesty may, in order to discharge lawful obligations of and satisfy claims against the Contractor or a subcontractor arising out of the performance of the contract, pay any amount that is due and payable to the Contractor pursuant to the contract directly to the obliges of and the claimants against the Contractor or the subcontractor but such amount, if any, as is paid by Her Majesty shall not exceed that amount which the Contractor would have been obliged to pay to such claimant had the provisions of the Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, been applicable to the work. Any such claimant need not comply with the provisions of such legislation setting out the steps by way of notice, registration or otherwise as might have been necessary to preserve or perfect any claim for lien or privilege which claimant might have had;

42.2 Her Majesty will not make any payment as described in GC42.1 unless and until that claimant shall have delivered to Her Majesty :

42.2.1 a binding and enforceable Judgment or Order of a court of competent jurisdiction setting forth such amount as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or

42.2.2 a final and enforceable award of an arbitrator setting forth such amounts as would have been payable by the Contractor to the claimant pursuant to the provisions of the applicable Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, had such legislation been applicable to the work; or

42.2.3 the consent of the Contractor authorizing a payment.

For the purposes of determining the entitlement of a claimant pursuant to GC42.2.1 and GC42.2.2, the notice required by GC42.8 shall be deemed to replace the registration or provisions of notice after the performance of work as required by any applicable legislation and no claim shall be deemed to have expired, become void or unenforceable by reason of the claimant not commencing any action within the time prescribed by any applicable legislation.

42.3 The Contractor shall, by the execution of this contract, be deemed to have consented to submit to binding arbitration at the request of any claimant those questions that need be answered to establish the entitlement of the claimant to payment pursuant to the provisions of GC42.1 and such arbitration shall have as parties to it any subcontractor to whom the claimant supplied material, performed work or rented equipment should such subcontractor wish to be adjoined and the Crown shall not be a party to such arbitration and, subject to

any agreement between the Contractor and the claimant to the contrary, the arbitration shall be conducted in accordance with the Provincial or Territorial legislation governing arbitration applicable in the Province or Territory in which the work is located.

42.4 A payment made pursuant to GC42.1 is, to the extent of the payment, a discharge of Her Majesty's liability to the Contractor under the contract and may be deducted from any amount payable to the Contractor under the contract.

42.5 To the extent that the circumstances of the work being performed for Her Majesty permit, the Contractor shall comply with all laws in force in the Province or Territory where the work is being performed relating to payment period, mandatory holdbacks, and creation and enforcement of mechanics' liens, builders' liens or similar legislation or in the Province of Quebec, the law relating to privileges.



- 42.6 The Contractor shall discharge all his lawful obligations and shall satisfy all lawful claims against him arising out of the performance of the work at least as often as the contract requires Her Majesty to pay the Contractor.
- 42.7 The Contractor shall, whenever requested to do so by the Engineer, make a statutory declaration deposing to the existence and condition of any obligations and claims referred to in GC42.6,
- 42.8 GC42.1 shall only apply to claims and obligations :
- 42.8.1 the notification of which has been received by the Engineer in writing before payment is made to the Contractor pursuant to TP4.10 and within 120 days of the date on which the claimant
- 42.8.1.1 should have been paid in full under the claimant's contract with the Contractor or subcontractor where the claim is for money that was lawfully required to be held back from the claimant; or
- 42.8.1.2 performed the last of the services, work or labour, or furnished the last of the material pursuant to the claimant's contract with the Contractor or subcontractor where the claim is not for money referred to in GC42.8.1.1, and
- 42.8.2 the proceedings to determine the right to payment of which, pursuant to GC42.2 shall have commenced within one year from the date that the notice referred to in GC42.8.1 was received by the Engineer, and
- the notification required by GC42.8.1 shall set forth the amount claimed to be owing and the person who by contract is primarily liable.
- 42.9 Her Majesty may upon receipt of a notice of claim under GC42.8.1, without from any amount that is due and payable to the Contractor pursuant to the contract the full amount of the claim or any portion thereof.
- 42.10 The Engineer shall notify the Contractor in writing of receipt of any claim referred to in GC42.8.2 and of the intention of Her Majesty to withhold funds pursuant to GC42.9 and the Contractor may, at any time thereafter and until payment is made to the claimant, be entitled to post, with Her Majesty security in a form acceptable to Her Majesty in an amount equal to the value of the claim, the notice of which is received by the Engineer and upon receipt of such security, Her Majesty shall release to the Contractor any funds which would be otherwise payable to the Contractor, that were withheld pursuant to the provisions of GC42.9 in respect of the claim of any claimant for whom the security stands.

GC43 Security Deposit – Forfeiture or Return

- 43.1 If
- 43.1.1 the work is taken out of the Contractor's hands pursuant to GC38,
- 43.1.2 the contract is terminated pursuant to GC41, or
- 43.1.3 the Contractor is in breach of or in default under the contract, Her Majesty may convert the security deposit, if any, to Her own use.
- 43.2 If Her Majesty converts the contract security pursuant to GC43.1, the amount realized shall be deemed to be an amount due from Her Majesty to the Contractor under the contract.
- 43.3 Any balance of an amount referred to in GC43.2 that remains after payment of all losses, damage and claims of Her Majesty and others shall be paid for by Her Majesty to the Contractor if, in the opinion of the Engineer, it is not required for the purposes of the contract.

GC44 Engineer's Certificates

- 44.1 On the date that
- 44.1.1 the work has been completed, and



- 44.1.2 the Contractor has complied with the contract and all orders and directions made pursuant thereto,
- both to the satisfaction of the Engineer, the Engineer shall issue a Final Certificate of Completion to the Contractor.
- 44.2 If the Engineer is satisfied that the work is substantially complete he shall, at any time before he issues a certificate referred to in GC44.1, issue an Interim Certificate of Completion to the Contractor, and
- 44.2.1 for the purposes of GC44.2 the work will be considered to be substantially complete,
- 44.2.1.1 when the work under the contract or a substantial part thereof is, in the opinion of the Engineer, ready for use by Her Majesty or is being used for the purposes intended; and
- 44.2.1.2 when the work remaining to be done under the contract is, in the opinion of the Engineer, capable of completion or correction at a cost of not more than :
- 44.2.1.2.1 3% of the first \$500,000, and
- 44.2.1.2.2 2% of the next \$500,000, and
- 44.2.1.2.3 1% of the balance
- of the value of the contract at the time this cost is calculated.
- 44.3 For the sole purpose of GC44.2.1.2, where the work or a substantial part thereof is ready for use or is being used for the purpose intended and the remainder of the work or a part thereof cannot be completed by the time specified in A2.1, or as amended pursuant to GC36, for reasons beyond the control of the Contractor or where the Engineer and the Contractor agree not to complete a part of the work within the specified time, the cost of that part of the work which was either beyond the control of the Contractor to complete or the Engineer and the Contractor have agreed not to complete by the time specified shall be deducted from the value of the contract referred to GC44.2.1.2 and the said cost shall not form part of the cost of the work remaining to be done in determining substantial completion.
- 44.4 An Interim Certificate of Completion referred to in GC44.2 shall describe the parts of the work not completed to the satisfaction of the Engineer and all things that must be done by the Contractor :
- 44.4.1 before a Final Certificate of Completion referred to in GC 44.1 will be issued, and
- 44.4.2 before the 12-month period referred to in GC32.1.2 shall commence for the said parts and all the said things.
- 44.5 The Engineer may, in addition to the parts of the work described in an Interim Certificate of Completion referred to in GC44.2, require the Contractor to rectify any other parts of the work not completed to his satisfaction and to do any other things that are necessary for the satisfactory completion of the work.
- 44.6 If the contract or a part thereof is subject to a Unit Price Arrangement, the Engineer shall measure and record the quantities of labour, plant and material, performed, used and supplied by the Contractor in performing the work and shall, at the request of the Contractor, inform him of those measurements.
- 44.7 The Contractor shall assist and co-operate with the Engineer in the performance of his duties referred to in GC44.6 and shall be entitled to inspect any record made by the Engineer pursuant to GC44.6.
- 44.8 After the Engineer has issued a Final Certificate of Completion referred to in GC 44.1, he shall, if GC44.6 applies, issue a Final Certificate of Measurement.
- 44.9 A Final Certificate of Measurement referred to in GC44.8 shall :
- 44.9.1 contain the aggregate of all measurements of quantities referred to in GC44.5, and



44.9.2 be binding upon and conclusive between Her Majesty and the Contractor as to the quantities referred to therein.

GC45 Return to Security Deposit

- 45.1 After an Interim Certificate of Completion referred to in GC44.2 has been issued, Her Majesty shall, if the Contractor is not in breach of or in default under the contract, return to the Contractor all or any part of the security deposit that, in the opinion of the Engineer, is not required for the purposes of the contract.
- 45.2 After a Final Certificate of Completion referred to in GC 4401 has been issued, Her Majesty shall return to the Contractor the remainder of any security deposit unless the contract stipulates otherwise.
- 45.3 If the security deposit was paid into the Consolidated Revenue Fund of Canada, Her Majesty shall pay interest thereon to the Contractor at a rate established from time to time pursuant to Section 21(2) of the *Financial Administration Act*.

GC46 Clarification of Terms in GC47 and GC50

- 46.1 For the purposes of GC47 to GC50 :
- 46.1.1 "Unit Price Table" means the table set out in the Articles of Agreement, and
- 46.1.2 "plant" does not include tools customarily provided by a tradesman in practicing his trade.

GC47 Additions or Amendments to Unit Price Table

- 47.1 Where a Unit Price Arrangement supplies to the contract or a part thereof the Engineer and the Contractor may, by an arrangement in writing :
- 47.1.1 add classes of labour, plant or material, and units of measurement, prices per unit and estimated quantities to the Unit Price Table if any labour, plant or material that is to be included in the Final Certificate of Measurement referred to in GC44.8 is not included in any class of labour, plant or material set out in the Unit Price Table; or
- 47.1.2 subject to GC47.2 and GC47.3, amend a price per unit set out in the Unit Price Table for any class of labour, plant or material included therein if the Final Certificate of Measurement referred to in GC44.8 shows or is expected to show that the total quantity of that class of labour, plant or material actually performed, used or supplied by the Contractor in performing the work is
- 47.1.2.1 less than 85 % of that estimated total quantity, or
- 47.1.2.2 in excess of 115 % of that estimated total quantity.
- 47.2 In no event shall the total cost of an item set out in the Unit Price Table that has been amended pursuant to GC47.1.2.1 exceed the amount that would have been payable to the Contractor had the estimated total quantity actually been performed, used or supplied.
- 47.3 An amendment that is made necessary by GC47.1.2.2 shall apply only to the quantities that are in excess of 115 %.
- 47.4 If the Engineer and the Contractor do not agree as contemplated in GC47.1, the Engineer shall determine the class and the unit of measurement of the labour, plant or material and, subject to GC47.2 and GC47.3, the price per unit therefore shall be determined in accordance with GC50.



GC48 Determination of Cost – Unit Price Table

- 48.1 Whenever, for the purposes of the contract it is necessary to determine the cost of labour, plant or material, it shall be determined by multiplying the quantity of that labour, plant or material expressed in the unit set out in column 3 of the Unit Price Table by the price of that unit set out in column 5 of the Unit Price Table.

GC49 Determine of Cost Prior to Undertaking Work : Lump Sum

- 49.1 If the method described in GC48 cannot be used because the labour, plant or material is of a kind or class that is not set out in the Unit Price Table, the cost of that labour, plant or material for the purposes of the contract shall be the amount agreed upon from time to time by the Contractor and the Engineer.
- 49.2 For the purposes of GC49.1, the Contractor shall submit to the Engineer any necessary cost information requested by the Engineer in respect of the labour, plant and material referred to in GC49.1.

GC50 Determine of Cost Following Completion of Work

- 50.1 Where it is not possible to pre-determine the cost of a change including elements not set out in the Unit Price Table, the actual cost of the change shall be equal to the aggregate of

- 50.1.1 all reasonable and, proper amounts actually expended or legally payable by the Contractor in respect of the labour, plant and material that falls within one of the classes of expenditure described in GC50.2 that are directly attributable to the performance of the contract;
- 50.1.2 an allowance for profit for all other expenditures or costs, included overhead, general administration costs, financing and interest charges, and every other cost, charge and expenses, but not including those referred to in GC50.1.1 or GC50.1.3 or of a class referred to in GC50.2, in an amount that is equal to 10 % of the sum of the expenses referred to in GC50.1.1 for that portion of the work undertaken by the Contractor's own forces, and 10 % for that portion of the work undertaken by subcontractors; plus
- 50.1.3 interest on the costs determined under GC50.1.1 and GC50.1.2, which interest shall be calculated in accordance with TP9;

provided that the total cost of an item set out in the Unit Price Table that is subject to the provisions of GC47.1.2.1 does not exceed the amount that would have been payable to the Contractor had the estimated total quantity of the said item actually been performed, used or supplied.

- 50.2 For the purposes of GC50.1.1 the classes of expenditure that may be taken into account in determining the cost of labour, plant and material are :
- 50.2.1 payments to subcontractors
- 50.2.2 wages, salaries and travelling expenses of employees of the Contractor located at the worksite and that portion of wages, salaries, bonuses, living and travelling expenses of personnel of the Contractor generally employed at the head office or at a general office to the Contractor provided they are actually and properly engaged on the work under the contract;
- 50.2.3 assessments payable under any statutory authority, which include, but are not exclusive to, workers' compensation, unemployment insurance, pension plan or holidays with pay, and provincial health or insurance plans;
- 50.2.4 rent that is paid for plant or an amount equivalent to the said rent if the plant is owned by the Contractor that is necessary for and used in the performance of the work, if the rent or the equivalent amount is reasonable and use of that plant has been approved by the Engineer;
- 50.2.5 payments for maintaining and operating plant necessary for and used in the performance of the work, and payments for effecting such repairs thereto as, in the opinion of the Engineer, are necessary to the proper performance of the contract other than payments for any repairs to the plant arising out of the defects existing before its allocation to the work;



- 50.2.6 payments for material that is necessary for and incorporated in the work, or that is necessary for and consumed in the performance of the contract;
- 50.2.7 payments for preparation, delivery, handling, erection, installation, inspection, protection and removal of the plant and material necessary for and used in the performance of the contract;
- 50.2.8 any other payments made by the Contractor with the approval of the Engineer that are necessary for the performance of the contract.

GC51 Records to be kept by Contractor

51.1 The Contractor shall :

- 51.1.1 maintain full records of his estimated and actual cost of the work together with all tender calls, quotations, contracts, correspondence, invoices, receipts and vouchers relating thereto;
- 51.1.2 make all records and material referred to in GC51.1.1 available to audit and Inspection by the Minister and the Deputy Receiver General for Canada or by persons acting on behalf of either or both of them, when requested;
- 51.1.3 allow any of the persons referred to in GC51.1.2 to make copies of and to take extracts from any of the records and material referred to in GC51.1.1; and
- 51.1.4 furnish any person referred to in GC51.1.2 with any information he may require from time to time in connection with such records and materials.

51.2 The records maintained by the Contractor pursuant to GC51.1.1 shall be kept intact by the Contractor until the expiration of two years after the date that a Final Certificate of Completion referred to in GC 44.1 was issued or until the expiration of such other period of time as the Minister may direct.

51.3 The Contractor shall cause all subcontractors and all other persons directly or indirectly controlled by or affiliated with the Contractor and all persons directly or indirectly having control of the Contractor to comply with GC51.1 and GC51.2 as if they were the Contractor.

GC52 Conflict of Interest

52.1 it is a term of this contract that no former public office holder who is not in compliance with the Conflict or Interest and Post-Employment Code for Public Office Holders shall derive a direct benefit from this contract.

GC53 Contractor Status

53.1 The Contractor shall be engaged under the contract as an independent Contractor.

53.2 The Contractor and any employee of the said Contractor is not engaged by the contract as an employee, servant or agent of Her Majesty.

53.3 For the purposes of GC53.1 and GC53.2 the Contractor shall be solely responsible for any and all payments and deductions required to be made by law including those required for Canada or Quebec Pension Plans, Unemployment Insurance, Worker's Compensation or Income Tax.

GC54 Determination of Cost – Clarification of Terms

54.1 For the purposes of GC50, the rental rates of machinery and equipment owned by the Contractor and by subcontractors retained in accordance with the provisions of GC54 shall be in accordance with the most current Schedule of Equipment Rental Rates as set out by the Provincial Highway's and Transportation Departments in the Province of the work.

54.2 Notwithstanding the provisions of GC50.1.2, the 10 % allowance shall not apply to rental equipment where the Engineer determines it is included in Provincial schedules.



- 54.3 Notwithstanding the provisions of GC50.2.5, the rental rates set out in the "Provincial Scheduling" shall be deemed to include payment for effecting repairs to plant used in the performance of the work.



APPENDIX "D"

LABOUR CONDITIONS / CONDITIONS DE TRAVAIL

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01 Interpretation

- (a) "Act" means the Fair Wages and Hours of Labour Act;
- (b) "Regulations" means the Fair Wages and Hours of Labour Regulations made pursuant to the Act;
- (c) "Contract" means the contract of which these Labour Conditions are part;
- (d) "Contracting Authority" means the department of Government or a crown corporation with whom the contract is made;
- (e) "Contractor" means the person who has entered into the contract with the contracting authority;
- (f) "regional Director" means the director of a regional office of the Department of Human Resources Development or the director's designated representative;
- (g) "Inspector" has the meaning assigned to the term by Part III of the Canada Labour Code;
- (h) "Minister" means the Minister of Labour of Canada;
- (i) "Persons" means those workers employed by the Contractor, subcontractor or any other person doing or contracting to do the whole or any part of the work contemplated by the contract;

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01 Interprétation

- (a) « Loi » désigne la Loi sur les justes salaires et les heures de travail;
- (b) « Règlement » désigne le Règlement sur les justes salaires et les heures de travail établi en application de la Loi;
- (c) « Contrat » désigne le contrat auquel sont annexées les présentes Conditions de travail;
- (d) « Adjudicateur » désigne le ministère du gouvernement ou la société d'État avec lequel le contrat a été passé;
- (e) « Entrepreneur » désigne la personne qui a passé le contrat avec l'adjudicateur;
- (f) « Directeur Régional » le responsable d'un bureau régional du ministère du Développement des ressources humaines ou son représentant désigné;
- (g) « Inspecteur » s'entend au sens de la partie III du Code canadien du travail;
- (h) « Ministre » désigne le ministre du Travail du Canada;
- (i) « Personnes » désigne les travailleurs employés par l'entrepreneur, le sous-traitant ou toute autre personne exécutant ou s'engageant par contrat à exécuter la totalité ou une partie quelconque des travaux prévus dans le contrat.



APPENDIX "D"

LABOUR CONDITIONS / CONDITIONS DE TRAVAIL

02 General Fair Wage Clause

- (a) All persons in the employ of the Contractor, subcontractor, or any other person doing or contracting to do the whole or any part of the work contemplated by the contract, shall during the continuance of the work :
 - (i) be paid fair wages that is, such wages as are generally accepted as current for competent workers in the district in which the work is being performed for the character or class of work in which such workers are respectively engaged; and
 - (ii) in all cases, be paid no less than the minimum hourly rate of pay established by the Labour Program of the Department of Human Resources Development in the Fair Wage Schedules which form a part of this contract as Appendix A to these Labour Conditions; and
 - (iii) for contracts covering work performed in the province of Québec, be paid at least the wage rates established by that province for the purposes of the Quebec « Construction Decree ».
- (b) Where there is no wage rate in the schedules referred to in (a) for a particular character or class of work, the Contractor shall pay wages for that character or class of work at a rate not less than the rate for an equivalent character or class of work.
- (c) Where during the term of the contract, the Contractor receives notice from the contracting authority of any change in wage rates, the Contractor shall pay not less than the Contractor shall pay not less than the changed wage rate beginning on the first day after receipt, by the Contractor, of the notice of the change in wage rates.

03 Hours of Work

- (a) The hours of work in a day and in a week of persons employed in the execution of the contract, including the hours of work in excess of which a person shall be paid overtime at a rate at least equal to one and one half times the fair wage, are the hours of work for the province in which the work is being performed as set out from the time to time in an Act of that province.
- (b) The daily or weekly hours of work referred to in paragraph (a) may be exceeded in accordance with the applicable provincial law.

02 Clause générale de justes salaires

- (a) Toutes les personnes employées par l'entrepreneur, le sous-traitant ou toute autre personne exécutant ou s'engageant par contrat à exécuter la totalité ou une partie quelconque des travaux prévus dans le contrat seront payées :
 - (i) des justes salaires tant que dureront les travaux, c'est-à-dire les salaires généralement reconnus comme salaires courants pour les travailleurs qualifiés dans la région où les travaux sont exécutés, selon la nature ou la catégorie du travail auquel ces travailleurs sont respectivement affectés, et
 - (ii) dans tous les cas, pas moins que les taux horaires minima fixes par le Programme du travail du ministère du Développement des ressources humaines dans les échelles de justes salaires qui deviennent partie de ce contrat en tant qu'Annexe A de ces Conditions de travail; et
 - (iii) pour les contrats concernant les travaux effectués dans la province de Québec, pas moins que les taux de salaires qui sont établis par cette province pour les fins du "Décret de la construction" du Québec.
- (b) Lorsqu'il n'y a aucun taux prévu dans l'échelle des taux de salaires à l'égard d'un travail d'une nature ou d'une catégorie donnée, l'entrepreneur verse à l'employé un taux de salaire qui n'est pas inférieur à celui établi pour un travail de nature ou de catégorie équivalente.
- (c) Lorsque pendant la durée du contrat, l'entrepreneur reçoit de l'adjudicateur un avis de modification à l'échelle de salaires, l'entrepreneur rémunère les employés touchés par cette modification à des taux qui ne sont pas inférieurs aux taux modifiés à compter de la journée qui suit la réception par lui, de l'avis.

03 Durée du travail

- (a) Les heures de travail quotidiennes et hebdomadaires des personnes employées à l'exécution du contrat, notamment les heures au-delà desquelles une personne doit être rétribuée selon le tarif pour heures supplémentaires, soit au moins le juste salaire majoré de 50 pour cent, sont celles fixées et éventuellement modifiées par la législation de la province dans laquelle le travail est effectué.
- (b) Les heures de travail quotidiennes ou hebdomadaires mentionnées à l'alinéa (a) peuvent être dépassées conformément à la législation provinciale applicable.



APPENDIX "D"

LABOUR CONDITIONS / CONDITIONS DE TRAVAIL

04 Labour Conditions to be Posted

- (a) For the information and the protection of all persons, the Contractor agrees to post and keep posted, in a conspicuous place on the premises where work contemplated by the contract is being carried out or on premises occupied or used by persons engaged in carrying out such work, a copy of these Labour Conditions, and a copy of the applicable Fair Wage Schedules along with any subsequent changes.

05 The Contractor to Keep Records which are to be Kept Open for Inspection

- (a) The Contractor agrees to keep books and records showing the names, addresses, classification of employment and work of all workers employed under the contract, the rate of wages to be paid, the wages paid and the daily hours worked by the workers.
- (b) The Contractor also agrees that the Contractor's books, records and premises will be open at all reasonable times for inspection by an inspector.
- (c) The Contractor also agrees to furnish the inspector and the contracting authority, on request, with such further information as is required to ascertain that the requirements of the Act, the Regulations and the contract with respect to wages, hours of work and other labour conditions have been complied with.

06 Department Requirements before Payment made to Contractor

- (a) The Contractor agrees that the Contractor will not be entitled to payment of any money otherwise payable under the contract until the Contractor has filed with the contracting authority in support of a claim for payment a sworn statement :
- (i) that the Contractor has kept the books and records required by these Regulations;
 - (ii) that there are no wages in arrears in respect of work performed under the contract; and
 - (iii) that to the Contractor's knowledge, all the conditions in the contract required by the Act and the Regulations have been complied with.

04 Affichage des conditions de travail

- (a) Pour l'information et la protection de toutes les personnes, l'entrepreneur convient d'afficher et de tenir affichés, bien à la vue, à l'endroit où les travaux prévus dans le contrat sont exécutés, ou dans les locaux occupés ou fréquentés par les personnes employées à l'exécution desdits travaux, un exemplaire des présente Conditions de travail, un exemplaire de l'échelle de justes salaires applicable et toutes modifications subséquentes.

05 L'entrepreneur tient des dossiers pour fins d'inspection

- (a) L'entrepreneur convient de tenir les registres et dossiers où sont consignés le nom, l'adresse et la catégorie d'emploi et de travail de tous les travailleurs employés à des travaux exécutés en vertu du contrat, de même que le taux de salaire, le salaire payé et la durée journalière du travail pour chacun de ces travailleurs.
- (b) L'entrepreneur convient également à faire en sorte que ses registres, ses dossiers et ses locaux soient accessibles en tout temps opportun, pour fins d'inspection par un inspecteur.
- (c) L'entrepreneur convient en outre de fournir, sur demande, à l'inspecteur et à l'adjudicateur tous les autres renseignements requis pour permettre de constater qu'on a satisfait aux exigences de la Loi, des règlements et du contrat en ce qui concerne les salaires, la durée du travail et les autres conditions de travail.

06 Exigences du ministère avant le versement des sommes dues à l'entrepreneur

- (a) L'entrepreneur convient qu'il n'aura droit au paiement d'aucune somme qui autrement devrait lui être versée en vertu du contrat tant qu'il n'aura pas déposé auprès de l'adjudicateur, à l'appui de sa réclamation de paiement, une déclaration sous serment indiquant :
- (i) qu'il a tenu les registres et dossiers requis par les présents règlements;
 - (ii) qu'il n'y a pas d'arriérés de salaires à l'égard des travaux exécutés en vertu du contrat, et
 - (iii) qu'à sa connaissance, toutes les conditions du contrat exigées par la Loi et les règlements ont été observées.



APPENDIX "D"

LABOUR CONDITIONS / CONDITIONS DE TRAVAIL

06 (...)

- (b) The Contractor also agrees that, where fair wages have not been paid by the Contractor to person employed under the contract, the contracting authority shall withhold from any money otherwise payable under the contract to the Contractor the amount necessary to ensure that fair wages are paid to all employees until fair wages are paid. paid to all employees until fair wages are paid.

07 Authority to pay Wages in the Event of Default by the Contractor

- (a) The Contractor agrees that where the Contractor is in default of payment of fair wages to an employee, the Contractor is in default.
- (b) The Contractor agrees that where the Contractor fails to comply with paragraph (a), the contracting authority will pay to the Receiver General, out of any money otherwise payable to the contract, the amount for which the Contractor is in default.

08 Conditions of Subcontracting

- (a) The Contractor and the subcontractor agree that in subcontracting any part of the work contemplated by the contract, they will place in the subcontract the conditions respecting fair wages, hours of work and other labour conditions set out in the contract and the requirements set out in Section 4. The Contractor further agrees that the Contractor will be responsible for carrying out these conditions in the event the subcontractor fails to carry them out.

09 Non-discrimination in Hiring and Employment of Labour

- (a) The Contractor agrees that in the hiring and employment of workers to perform any work under the contract, the Contractor will not refuse to employ and will not discriminate in any manner against any person because :
- (i) of that person's race, national or ethnic origin, colour, religion, age, sex, sexual orientation, marital status, disability, conviction for which a pardon has been granted, or family status;
- (ii) of the race, national or ethnic origin, colour, religion, age, sex, sexual orientation, marital status, disability, conviction for which a pardon has been granted, or family status of any person having a relationship or association with that person; or

06 (...)

- (b) L'entrepreneur convient en outre que lorsqu'il n'a pas versé un juste salaire à une personne employée en vertu du contrat, l'adjudicateur sera autorisé à retenir de toute somme autrement payable à l'entrepreneur en vertu du contrat la somme requise pour assurer le paiement de justes salaires à tous les employés, jusqu'à ce qu'ils aient touché leur juste salaire.

07 Paiement des salaires par l'adjudicateur si l'entrepreneur omet de le faire(a) L'entrepreneur convient qu'à défaut du paiement par ce dernier d'un juste salaire à un travailleur, l'entrepreneur devra verser au ministre le montant qu'il a omis de payer.

- (b) L'entrepreneur convient que s'il omet de se conformer au paragraphe (a), l'adjudicateur paiera au Receveur général, à même les sommes autrement payables à l'entrepreneur, le montant qu'il a omis de payer.

08 Conditions imposées à un sous-traitant

- (a) L'entrepreneur et le sous-traitant conviennent dans l'adjudication à un sous-traitant de toute partie des travaux prévus par le contrat, d'insérer dans le sous-contrat les conditions relatives aux justes salaires, à la durée du travail et autres conditions de travail indiquées dans le contrat ainsi que les obligations énoncées à l'article 4. L'entrepreneur convient en outre qu'il sera responsable du respect de ces conditions si elles ne sont pas respectées par le sous-traitant.

09 Non-discrimination dans l'embauchage et l'emploi de main-d'œuvre

- (a) L'entrepreneur convient que dans l'embauchage et l'emploi des travailleurs aux fins de l'exécution de tout travail en vertu du contrat, l'entrepreneur ne refusera pas d'employer une personne ou d'exercer de quelque façon que ce soit des distinctions injustes à l'endroit d'une personne en raison :
- (i) de la race, de l'origine nationale ou ethnique, de la couleur, de la religion, de l'âge, du sexe, de l'orientation sexuelle, de l'état matrimonial, de la situation de famille, de l'état de personne graciée ou d'une déficience de la personne;
- (ii) de la race, de l'origine nationale ou ethnique, de la couleur, de la religion, de l'âge, du sexe, de l'orientation sexuelle, de l'état matrimonial, de la situation de famille, de l'état de personne graciée ou d'une déficience de toute personne ayant un lien avec elle;



APPENDIX "D"

LABOUR CONDITIONS / CONDITIONS DE TRAVAIL

09 (...)

- (a) (iii) a complaint has been made or information has been given in respect of that person relating to an alleged failure by the Contractor to comply with subparagraph (i) or (ii).

09 (...)

- (iii) du fait que cette personne a porté plainte ou a fourni des renseignements ou parce qu'une plainte a été portée ou des renseignements ont été fournis en son nom relativement à toute prétendue omission de la part de l'entrepreneur de se conformer aux sous-alinéas (i) ou (ii).



APPENDIX "E"

INSURANCE CONDITIONS

The Contractor shall provide and maintain Worker's Compensation Insurance in accordance with the legal requirements of the Province where the work is being carried out.

The Contractor shall provide and maintain insurance as provided hereunder with companies approved by the Minister.

IC 1 INDEMNIFICATION

The insurance coverage required by the provisions of these Insurance Conditions shall in no way limit the Contractor's responsibility under GC8 (Indemnification by Contractor) of the General Conditions of the contract. Any additional coverage the Contractor may deem necessary to fulfil their obligations under the aforesaid GC8 shall be at their own discretion and expenses.

IC 2 INSURED

Each insurance policy shall insure the Contractor, and shall include as an Additional Named Insured, Her Majesty the Queen in right of Canada, represented by the Minister of Agriculture and Agri-Food Canada.

IC 3 PERIOD OF INSURANCE

Unless otherwise directed in writing by the Engineer, the policies required hereunder shall attach from the date of contract award and shall be maintained until the day of issue of the Engineer's Final Certificate of Completion.

IC 4 PROOF OF INSURANCE

Immediately following notification of contract award and preceding the start of any on-site work, the Contractor shall have their insurance broker or agency provide written confirmation (letter, telegram or facsimile) to the Engineer that all insurance required hereunder is in force.

Within 30 days after acceptance of the Contractor's tender the Contractor shall, unless otherwise directed by the Engineer, deposit with the Engineer, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the requirements of these Insurance Conditions.

IC 5 NOTIFICATION

Each insurance policy shall contain a provision that 30 days prior written notice shall be given to Her Majesty in the event of any material change in, cancellation of, or expiration of coverage.

IC 6 PAYMENT OF DEDUCTIBLE

The amount of any claim up to the deductible amount shall be borne by the Contractor.

IC 7 COMPREHENSIVE GENERAL LIABILITY

7.1 The policy shall be written on the Comprehensive General Liability Form.

7.2 This policy shall provide for limits of liability of not less than \$1,000,000 inclusive, for Bodily Injury and Property Damage for any one occurrence or series of occurrences arising out of one cause and not less than \$1,000,000 for personal injury.

7.3 The policy shall include but not necessarily be limited to the following coverages :



- 7.3.1 All premises, property and operations necessary or incidental to the performance of this contract.
- 7.3.2 Personal injury.
- 7.3.3 Bodily Injury and Property Damage on an "occurrence" basis.
- 7.3.4 "Broad Form" Property Damage including the loss of use of property.
- 7.3.5 Removal or weakening of support of any property, building or land whether such support be natural or otherwise.
- 7.3.6 Elevators.
- 7.3.7 Contingent Employer's Liability.
- 7.3.8 Owner's and Contractor's Protective Liability.
- 7.3.9 Contractual and Assumed Liabilities under this contract.
- 7.3.10 Completed Operations and Products Liability.
- 7.3.11 Cross Liability*.

* The clause shall be written, as follows:

CROSS LIABILITY

The insurance as is afforded by this policy shall apply in respect to any claim or action brought against any one Insured by any other Insured. The coverage shall apply in the same manner and to the same extent as though a separate policy had been issued to each Insured. The inclusion herein of more than one Insured shall not operate to increase the limit of the Insurer's liability.

- 7.4 The policy shall be endorsed to include the following exposures or hazards if the work is subject thereto :
 - 7.4.1 Blasting;
 - 7.4.2 Pile Driving and Caisson Work;
 - 7.4.3 Underpinning;
 - 7.4.4 Demolition.
- 7.5 The insurance shall continue for a period of at least one year beyond the date of the Engineer's Final Certificate of Completion for the Completed Operations Hazard.
- 7.6 The policy shall be issued with a deductible amount of not more than \$1,000.00 per occurrence applying to Property Damage claims only.

IC 8

AUTOMOBILE LIABILITY INSURANCE

Automobile Liability Insurance in respect of licensed vehicles shall have limits of not less than one million dollars inclusive per occurrence for bodily injury, death, and damage to property, in the following forms endorsed to provide Her Majesty with not less than 30 days written notice in advance of any cancellation or change or amendment restricting coverage :

- 8.1.1 Standard non-Owned Automobile Policy including Standard Contractual Liability Endorsement.



- 8.1.2 Standard Owner's Form Automobile Policy providing Third Party Liability and Accident Benefits Insurance and covering licensed vehicles owned or operated by or on behalf of the Contractor.



APPENDIX "F"

CONTRACT SECURITY CONDITIONS

CS1 Obligation to Provide Contract Security

- 1.1. The Contractor shall, at the Contractor's own expense, provide one or more of the forms of contract security prescribed in CS2.
- 1.2. The Contractor shall deliver to the Engineer the contract security referred to in CS1.1 within 14 days after the date that the Contractor receives notice that the Contractor's tender or offer was accepted by Her Majesty.

CS2 Prescribed Types and Amounts of Contract Security

- 2.1 The Contractor shall deliver to the Engineer pursuant to CS1:
 - 2.1.1 a performance bond and a labour and material payment bond each in an amount that is equal to not less than 50 % of the contract amount referred to in the Articles of Agreement; or
 - 2.1.2 a labour and material bond in the amount that is equal to not less than 50 % of the contract amount referred to in the Articles of Agreement, and a security deposit in an amount that is equal to :
 - 2.1.2.1 not less than 10 % of the contract amount referred to in the Articles of Agreement where that amount does not exceed \$250,000; or
 - 2.1.2.2 \$25,000 plus 5 % of the part of the contract amount referred to in the Articles of Agreement that exceeds \$250,000; or
 - 2.1.3 a security deposit in an amount prescribed by CS2.1.2, plus an additional amount that is equal to 10 % of the contract amount referred to in the Articles of Agreement; or
 - 2.1.4 an irrevocable contract support letter of credit in an amount equal to 20 % of the contract amount referred to in the Articles of Agreement.
- 2.2 A performance bond and a labour and material payment bond referred to in CS2.1 shall be in a form and be issued by a bonding or surety company that is approved by Her Majesty.
- 2.3 An irrevocable contract support letter of credit shall be in a form approved by Her Majesty.
- 2.4 The amount of a security deposit referred to in CS2.1.2 shall not exceed \$250,000 regardless of the contract amount referred to in the Articles of Agreement.
- 2.5 A security deposit referred to in CS2.1.2 and CS2.1.3 shall be in the form of :
 - 2.5.2 a bill of exchange made payable to the Receiver General for Canada and certified by an approved financial institution or drawn by an approved financial institution on itself; or
 - 2.5.3 bonds of unconditionally guaranteed as to principal and interest by the Government of Canada.
- 2.6 For purposes of CS2.5 :
 - 2.6.2 a bill of exchange is an unconditional order in writing signed by the Contractor and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed determinable future time a sum certain of money to, or to the order of, the Receiver General for Canada; and



- 2.6.3 if a bill of exchange is certified by a financial institution other than a chartered bank then it must be accompanied by a letter or stamped certification confirming that the financial institution is in at least one of the categories referred to in CS2.6.3.
- 2.6.4 an approved financial institution is :
 - 2.6.4.1 any corporation or institution that is a member of the Canadian Payments Association;
 - 2.6.4.2 a corporation that accepts deposits that are insured by the Canadian Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec to the maximum permitted by law;
 - 2.6.4.3 a credit union as defined in paragraph 137(6)(b) of the Income Tax Act;
 - 2.6.4.4 a corporation that accepts deposits from the public, if repayment of the deposit is guaranteed by Her Majesty in right of a province; or
 - 2.6.4.5 the Canada Post Corporation;
- 2.6.5 the bonds referred to in CS2.5.2 shall be :
 - 2.6.5.1 made payable to bearer; or
 - 2.6.5.2 accompanied by a duly executed instrument of transfer of the bonds to the Receiver General for Canada in the form prescribed by the Domestic Bonds of Canada Regulations; or
 - 2.6.5.3 registered, as to principal or as to principal and interest in the name of the Receiver General for Canada pursuant to the Domestic Bonds of Canada Regulations; or
 - 2.6.5.4 provided on the basis of their market value current at the date of the contract.



TENDER FORM

PROJECT:

Installation of 4 cold rooms and 1 growth room

DATE OF RECEIPT:

Quotations will be received until 2:00 p.m., Eastern Standard Time, Monday, March 7th, 2014.

TO:

DATE:

Carol Rahal
Agriculture and Agri-Food Canada
2001 University, 671 -TEN
Montreal, Quebec
Telephone : 514 315-6143
Facsimile : 514 283-3143
carol.rahal@agr.gc.ca

We, the undersigned, hereby offer the Honourable Minister of Agriculture and Agri-Food to furnish, execute and complete in a satisfactory and workmanlike manner, in accordance with the specifications, schedules, drawings and conditions, all the work required for this project for the consideration of the unit or lump sum price or prices set forth in the attached UNIT PRICE TABLE. We hereby agree that we will enter into a contract, of the form exhibited to us, for the execution of the work, if required to do so within 10 calendar days after the opening of bids.

We herewith enclose as Tender Security, either

- (a) a Security deposit in the amount and in the form prescribed in the Instructions to Tenderers, or
- (b) a Bid Bond in the amount and in the form prescribed in the Instructions to Tenderers executed by ourselves and as Surety.

We agree upon execution of the Contract to furnish additional security in one of the three (3) alternate forms prescribed in Appendix "F", "Contract Security Conditions".

We further agree that if awarded the contract, we will commence the work as specified and will complete the work on or before **July 11th, 2014**.

We hereby acknowledge receipt of the following addenda to the tender documents (give number and date of each).

Addenda Numbers: _____

Date: _____

**TENDER FORM****UNIT PRICE TABLE**

Item	Class of Labour Plant or Material	Unit of Measurement	Estimated Total Quantity	Price per Unit	Estimated Total Price
1.	Entire project	Lump sum	N/A	N/A	
2.	N/A	Lump sum	N/A	N/A	N/A
3.	N/A	Lump sum	N/A	N/A	N/A
4.	N/A	Lump sum	N/A	N/A	N/A
5.	N/A	Lump sum	N/A	N/A	N/A
6.	N/A	Lump sum	N/A	N/A	N/A
7.	N/A	Dollars	N/A	N/A	N/A
TOTAL TENDER (GST/HST extra)					\$

NOTE : BOTH PRICE PER UNIT AND ESTIMATED TOTAL PRICE MUST BE FILLED IN FOR EACH ITEM IN THE UNIT PRICE TABLE.
ALL ESTIMATED TOTAL PRICES WILL BE SUBJECT TO VERIFICATION BY CANADA.

IN CASE OF VARIATION BETWEEN THE PRICE PER UNIT AND THE ESTIMATED TOTAL PRICE, THE PRICE PER UNIT WILL
BE CONSIDERED TO BE THE PRICE TENDERED.

IN WITNESS whereof (I/We) have hereunto set (my/our) hand(s)

This _____ day of _____, 2013

FIRM NAME : _____

Signature(s) : _____

Print name(s)
of Signatory(ies) : _____

Address : _____

Telephone No. : _____ Facsimile No. : _____

Note: Corporate Firms shall affix their Corporate Seal.

For departmental use only

Tender opened in : _____ on : _____, 2014 @ _____ AM G / PM G



TENDER FORM

LIST OF SUBCONTRACTORS

I/ We will subcontract the following parts of the work to the subcontractors listed for each part. I/We agree not to make changes in the following list without the written consent of the Engineer. In my/our opinion the subcontractors named hereunder are reliable and competent to perform that part of the work for which each is listed. The parts of the work not listed below will be performed with my/our own forces.

Part of Work	Subcontractor	Address



TENDER FORM

STATEMENT OF EQUIPMENT

Listed below is a description of equipment owned by the Contractor and the subcontractors listed on "List of Subcontractors" which I/we intend to make available for the satisfactory prosecution of the work of this contract.

Owned (Contractor or Subcontractor)	Description Of Unit (Make, Model, Year)	Capacity, Size, Horsepower, Rating	Condition	Present Location



ARTICLES OF AGREEMENT

Gender

For the sake of conciseness, wherever the forms “he”, “him” and “his” appear, they are to be understood in the generic sense that includes “she” and its related forms.

These Articles of Agreement made in duplicate this *day of* 2014

Between

Her Majesty the Queen, in right of Canada (referred to in the contract documents as “**Her Majesty**”) represented by the Minister of Agriculture and Agri-Food (referred to in the contract documents as the “Minister”)

and * (referred to in the contract documents as the “Contractor”)

Witness that in consideration for the mutual promises and obligations contained in the contract. Her Majesty and the Contractor covenant and agree as follows:

A1 Contract Documents

- 1.1 Subject to A1 and A1.5, the documents forming the contract between Her Majesty and the Contractor, referred to herein as the contract documents, are
 - 1.1.1 these Articles of Agreement,
 - 1.1.2 the documents attached hereto, marked “Appendix A” and entitled “Specifications” referred to herein as the Specifications,
 - 1.1.3 the document attached hereto, marked “Appendix B” and entitled “Terms of Payment”, referred to herein as the Terms of Payment,
 - 1.1.4 the document attached hereto marked “Appendix C” and entitled “General Conditions”, referred to herein as the General Conditions,
 - 1.1.5 the document attached hereto, marked “Appendix D” and entitled “Labour Conditions”, referred to herein as the Labour Conditions,
 - 1.1.6 the document attached hereto, marked “Appendix E” and entitled “Insurance Conditions”, referred to herein as the Insurance Conditions,
 - 1.1.7 the document attached hereto, marked “Appendix F” and entitled “Contract Security Conditions”, referred to herein as the Contract Security Conditions,
 - 1.1.8 the documents attached hereto, entitled “Plans”, referred to herein as the Plans, and
 - 1.1.9 any amendment or variation of the contract documents that is made in accordance with the General Conditions.
- 1.2 The Minister hereby designates the Senior Procurement Officer, Agriculture and Agri-Food Canada, of the Government of Canada, as the Contracting Authority for the purposes of the contract, and for all purposes of or incidental to the contract the Contracting Officer address shall be deemed to be :

Agriculture and Agri-Food Canada
2001 University Street, Suite 671-TEN
Montreal (Quebec)
H3A 3N2



1.3 In the Contract

1.3.1 **“Fixed Price Arrangement”** means that part of the contract that prescribes a lump sum as payment for performance of the work to which it relates; and

1.3.2 **“Unit Price Arrangement”** means that part of the contract that prescribes the product of a price multiplied by a number of units of measurement of a class as payment for performance of the work to which it related.

1.4 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Unit Price Arrangement are not applicable to any part of the work to which a Fixed Price Arrangement is applicable.

1.5 Any of the provisions of the contract that are expressly stipulated to be applicable only to a Fixed Price Arrangement are not applicable to any part of the work to which a Unit Price Arrangement is applicable.

A2 Date of Completion of Work and Description of Work

2.1 The Contractor shall, between the date of these Articles of Agreement and **July 11th, 2014**, in a careful and workmanlike manner, diligently perform and complete the following work :

“Installations of 4 Cold Rooms and 1 Growth Room in London, Ontario”

which work is more particularly described in the Plans and Specifications.

A3 Contract Amount

3.1 Subject to any increase, decrease, deduction, reduction or set-off that may be made under the contract, Her Majesty shall pay the Contractor at the times and in the manner that is set out or referred to in the Terms of Payment

3.1.1 the sum of \$ [REDACTED] in consideration for the performance of the work or the part thereof that is subject to a Fixed Price Arrangement, and

3.1.2 a sum that is equal to the aggregate of the products of the number of units of measurement of each class of labour plant and material that is set out in a Final Certificate of Measurement referred to in GC44.8 multiplied in each case by the appropriate unit price that is set out in the Unit Price Table in consideration for the performance of the work or the part thereof that is subject to a Unit Price Arrangement.

3.2 For the information and guidance of the Contractor and the persons administering the contract on behalf of Her Majesty, but not so as to constitute a warranty, representation or undertaking of any nature by either party, it is estimated that the total amount payable by Her Majesty to the Contractor for the part of the work to which a Unit price Arrangement is applicable will not exceed \$* (*).

3.3 A3.1.1 is applicable only to a Fixed Price Arrangement.

3.4 A3.1.2 and A3.2 are applicable only to a Unit Price Arrangement.

A4 Contractors Address

4.1 For all purposes of or incidental to the contract, the Contractor's address shall be deemed to be:





A5 Unit Price Table

5.1 Her Majesty and the Contractor agree that the following table is the Unit Price Table for the purposes of the contract :

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>	<i>Column 5</i>	<i>Column 6</i>
Item	Class of Labour Plant or Material	Unit of Measurement	Estimated Total Quantity	Price Per Unit	Estimated Total Price
1				\$	\$
2				\$	\$
3				\$	\$
4				\$	\$
5				\$	\$
6				\$	\$
7				\$	\$
8				\$	\$

Unit Price Table (Concluded)

<i>Column 1</i>	<i>Column 2</i>	<i>Column 3</i>	<i>Column 4</i>	<i>Column 5</i>	<i>Column 6</i>
Item	Class of Labour Plant or Material	Unit of Measurement	Estimated Total Quantity	Price Per Unit	Estimated Total Price
1				\$	\$
2				\$	\$
3				\$	\$
4				\$	\$
5				\$	\$
6				\$	\$
7				\$	\$
8				\$	\$



- 5.2 The Unit Price Table that is set out in A5.1 designates the part of the work to which a Unit Price Arrangement is applicable.
- 5.3 The part of the work that is not designated in the Unit Price Table referred to in A5.2 is the part of the work to which a Fixed Price Arrangement is applicable.

N.B.:

The attention of the Contractor is drawn to the following statutory provision:

"It is a term of every contract providing for the payment of any money by Her Majesty that payment thereunder is subject to there being an appropriation for the particular service for the fiscal year in which any commitment thereunder would come in course of payment".

Section 40, Financial Administration Act, R.S. 1985, c.F-11

Signed on behalf of **Her Majesty**

by _____
Full Name

as _____
Title

Date: _____

Signature

Signed on behalf of **The Consultant/Contractor**

by _____
Full Name

as _____
Title

Date: _____

Signature



Plans

ARCHITECTURAL:

- A000 COVER SHEET AND LIST OF DRAWINGS
- A001 KEY PLANS AND SYMBOLS LEGEND
- A200 ENLARGED FLOOR PLANS, ELEVATIONS AND DETAILS
- A201 ENLARGED FLOOR PLANS, ELEVATIONS AND DETAILS

MECHANICAL:

- M101 MECHANICAL LEGEND, DRAWING LIST, SCHEDULES AND DEMOLITION
- M201 PART FLOOR PLANS MECHANICAL
- M302 PART FLOOR PLANS MECHANICAL, CONTROLS AND SECTIONS

ELECTRICAL:

- E101 ELECTRICAL LEGEND, ABBREVIATIONS, PLANS, DETAILS AND ELECTRICAL RISER