Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

Solicitation Cover Page

RETURN BIDS TO:
Agriculture and Agri-Food Canada

Address: Eastern Service Centre

Attention: Jean-François Lemay

Email: aafc.escprocurement-cseapprovisionnement.aac@agr.gc.ca

REQUEST FOR PROPOSAL

Proposal To: Agriculture and Agri-Food Canada
We hereby offer to sell to His Majesty the King in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods and service, and construction as listed herein and on any attached sheets at the price(s) set out therefore.

Comments:

Vendor/Firm Name and Address:

Issuing Office
Agriculture and Agri-Food Canada

Eastern Service Centre
2001 Robert-Bourassa
Montreal, Quebec, H3A 3N2

Title: Dust removal corrections to building 76 at AAFC Sherbrooke RDC	
Solicitation Number: 01B46-24-010	Date of solicitation: 2024-02-21
Solicitation Closes: At: 2:00pm On: 2024-03-08	Time Zone: EST
Address Enquiries to: Procurement Officer : Name: Jean-François Lemay Email: jean-francois.lemay@agr.gc.ca	
Telephone Number: 343-571-9706	FAX Number:
Destination of Goods, Services and Construction: Sherbrooke Research & Development Center 2000 Collège Street Sherbrooke, Quebec, J1M 0C8	
Instructions: Municipal taxes are not applicable. Unless otherwise specified herein all prices quoted must include all applicable Canadian customs duties, GST/HST, excise taxes and are to be delivered Delivery Duty Paid including all delivery charges to destination(s) as indicated. The amount of the Goods and Services Tax/Harmonized Sales Tax is to be shown as a separate item.	
Delivery required: 2025-01-15	Delivery offered:
Vendor/Firm Name and Address:	
Name and title of person authorized to sign on behalf of vendor/firm (type or print)	
Signature Date	

Canada

INVITATION TO TENDER

Dust removal corrections to building 76 at AAFC Sherbrooke RDC

IMPORTANT NOTICE TO BIDDERS
Note to Bidders, there will no Public Opening for the purposes of this solicitation. See SI07 for further Instructions.

TABLE OF CONTENTS

SPECIAL INSTRUCTIONS TO BIDDERS (SI)

SI01 BID DOCUMENTS

1. The following are the Bid Documents:

   a. Invitation to Tender - Page 1;
   b. Special Instructions to Bidders;
   c. General Instructions - Construction Services - Bid Security Requirements R2710T (2021-04-01)
      Delete: Subsection GI16 Performance Evaluation: in its entirety
      Insert: GI16 intentionally left blank
      Delete: point 3 in its entirety
   d. Clauses & Conditions identified in “Contract Documents”;
   e. Drawings and Specifications;
   f. Bid and Acceptance Form and related Appendix(s); and
   g. Any amendment issued prior to solicitation closing.

   Submission of a bid constitutes acknowledgement that the Bidder has read and agrees to be bound by these documents.

2. General Instructions - Construction Services - Bid Security Requirements R2710T is incorporated by reference and is set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site: https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R

SI02 ENQUIRIES DURING THE SOLICITATION PERIOD

1. Enquiries regarding this bid must be submitted in writing to the Contracting Authority named on the Invitation to Tender - Page 1. Except for the approval of alternative materials as described in GI15 of R2710T, enquiries should be received no later than 5 business days prior to the date set for solicitation closing to allow sufficient time to provide a response. Enquiries received after that time may result in an answer not being provided.

2. To ensure consistency and quality of the information provided to Bidders, AAFC will examine the content of the enquiry and will decide whether to issue an amendment.

3. All enquiries and other communications related to this bid sent throughout the solicitation period must be directed ONLY to the Contracting Authority named in paragraph 1 above. Failure to comply with this requirement may result in the bid being declared non- compliant.

SI03 OPTIONAL SITE VISIT

There will be a site visit on February 28, 2024 @ 10H00AM. Interested bidders are to meet at :
Sherbrooke Research & Development Center
2000 Collège Street
Sherbrooke, Quebec, J1M 0C8

The representative of the Bidder must sign the Site Visit Attendance Sheet at the site visit.

SI04 REVISION OF BID

Section GI10 of R2710T is replaced by the following;

1. A bid submitted in accordance with these instructions may be revised, provided the revision is received through Canada Post Corporation's (CPC) Connect service, on or before the date and time set for the closing of the solicitation. The revision shall be on the Bidder's letterhead or bear a signature that identifies the Bidder.
   a. The only acceptable email address to use with CPC Connect is: aafc.procbidreceiving-receptiondesoumissionaprov.aac@agr.gc.ca
2. A revision to a bid that includes unit prices must clearly identify the change(s) in the unit price(s) and the specific item(s) to which each change applies.
3. Multiple revisions to a bid must clearly identify the sequence of the revisions (i.e. Bid revision #1; Bid revision #2, etc.).

4. Failure to comply with any of the above provisions may result in the rejection of the non-compliant revision(s) only. The bid shall be evaluated based on the original bid submitted and all other compliant revision(s).
5. For revised bids transmitted by CPC Connect service, Canada will not be responsible for any failure attributable to the transmission or receipt of the bid including, but not limited to, the following:
   i. receipt of a garbled, corrupted or incomplete bid;
   ii. availability or condition of the CPC Connect service;
   iii. incompatibility between the sending and receiving equipment;
   iv. delay in transmission or receipt of the bid;
   v. failure of the Bidder to properly identify the bid;
   vi. illegibility of the bid;
   vii. security of bid data; or,
   viii. inability to create an electronic conversation through the CPC Connect service.

SI05 BID SECURITY REQUIREMENTS

R2710T - General Instructions - Construction Services - Bid Security Requirements is modified as follow:

Delete GI08.2 and replace with the following:

2. A bid bond (form PWGSC-TPSGC 504) shall be in an approved form, properly completed, with valid and enforceable signatures and sealed by the approved bonding company whose bonds are acceptable to Canada either at the time of solicitation closing or as identified in Treasury Board Appendix L, Acceptable Bonding Companies.

2.1 A bid bond may be submitted in an electronic format (Electronic Bonding (E-Bond)) if it meets the following criteria:

a. The version submitted by the Bidder must be an electronic encrypted file with embedded digital certificate verifiable by Canada with respect to the totality and wholeness of the bond form, including: the content; all digital signatures; all digital seals; with the Surety Company, or an approved verification service provider of the Surety Company.
b. The version submitted must be viewable, printable and storable in standard electronic file formats compatible with Canada, and in a single file, allowable format pdf.
c. The verification may be conducted by Canada immediately or at any time during the life of the Bond and at the discretion of Canada.
d. The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding Item 2.1.a.
e. Submitting copies **(non-original, non-verifiable or scanned copy)** of signed and sealed bid bond are not acceptable. Failure to submit an original or verifiable bond will render the bid non-compliant. Non-compliant bids will be given no further consideration. A scanned copy of a bond does not constitute a digital bond.

2.2 Bonds failing the verification process will NOT be considered valid.

2.3 Bonds passing the verification process will be treated as original and authentic.

SI06 SUBMISSION OF BID

Section GI09 of R2710T is modified by the following:

Insert the following text under subparagraph 4.

5. Electronic Bid Submission by Canada Post Corporation (CPC) Connect service

a. Unless specified otherwise in the bid solicitation, bids may be submitted by using the Connect service provided by Canada Post Corporation.

The only acceptable email address to use with CPC Connect for responses to bid solicitations issued by Agriculture and Agri-Food Canada is: aafc.procbidreceiving-receptiondesoumissionaprov.aac@agr.gc.ca

Note: Bids will not be accepted if emailed directly to this email address. This email address is to be used to open a CPC Connect conversation, as detailed in “c.” below of this solicitation, or to send bids through a CPC Connect message if the bidder is using its own licensing agreement for CPC Connect service.

b. To submit a bid using CPC Connect service, the Bidder must either:
   i. send directly its bid only to the specified AAFC Bid Receiving Unit, using its own licensing agreement for CPC Connect provided by Canada Post Corporation; or
   ii. send as early as possible, and in any case, at least six business days prior to the solicitation closing date and time, (in order to ensure a response), an email that includes the bid solicitation number to the specified AAFC Bid Receiving Unit requesting to open a CPC Connect conversation. Requests to open a CPC Connect conversation received after that time may not be answered.
c. If the Bidder sends an email requesting CPC Connect service to the specified AAFC Bid Receiving Unit in the bid solicitation, an officer of the AAFC Bid Receiving Unit will then initiate a CPC Connect conversation. The CPC Connect conversation will create an email notification from Canada Post Corporation prompting the Bidder to access and action the message within the conversation. The Bidder will then be able to transmit its bid afterward at any time prior to the solicitation closing date and time.
d. If the Bidder is using its own licensing agreement to send its bid, the Bidder must keep the CPC Connect conversation open until at least 30 business days after the solicitation closing date and time.
e. The bid solicitation number should be identified in the CPC Connect message field of all electronic transfers.
f. It should be noted that the use of CPC Connect service requires a Canadian mailing address. Should a bidder not have a Canadian mailing address, they may use the AAFC Bid Receiving Unit address specified in the solicitation in order to register for the CPC Connect service.
g. For bids transmitted by CPC Connect service, Canada will not be responsible for any failure attributable to the transmission or receipt of the bid including, but not limited to, the following:
   i. receipt of a garbled, corrupted or incomplete bid;
   ii. availability or condition of the CPC Connect service;
   iii. incompatibility between the sending and receiving equipment;
   iv. delay in transmission or receipt of the bid;
   v. failure of the Bidder to properly identify the bid;
   vi. illegibility of the bid;
   vii. security of bid data; or,
   viii. inability to create an electronic conversation through the CPC Connect service.
h. AAFC Bid Receiving Unit will send an acknowledgement of the receipt of bid document(s) via the CPC Connect conversation, regardless of whether the conversation was initiated by the supplier using its own license or AAFC Bid Receiving Unit. This acknowledgement will confirm only the receipt of bid document(s) and will not confirm if the attachments may be opened nor if the content is readable.
i. Bidders must ensure that that they are using the correct email address for the AAFC Bid Receiving Unit when initiating a conversation in CPC Connect or communicating with the AAFC Bid Receiving Unit and should not rely on the accuracy of copying and pasting the email address into the CPC Connect system.
j. A bid transmitted by CPC Connect service constitutes the formal bid of the Bidder.
k. Alternate arrangements of bid receipt can be made by contacting the Contracting Authority identified on page 1 of the solicitation package no later than one (1) business day prior to bid closing.

SI07 BID RESULTS

There will be no Public Opening for the purposes of this solicitation.

The responsive bid carrying the lowest price will be recommended for contract award.

SI08 INSUFFICIENT FUNDING

In the event that the lowest compliant bid exceeds the amount of funding allocated for the Work, Canada in its sole discretion may

a. cancel the solicitation; or
b. obtain additional funding and award the Contract to the Bidder submitting the lowest compliant bid.

SI09 BID VALIDITY PERIOD

1. Canada reserves the right to seek an extension to the bid validity period prescribed in BA04 of the Bid and Acceptance Form. Upon notification in writing from Canada, Bidders will have the option to either accept or reject the proposed extension.

2. If the extension referred to in paragraph 1. above is accepted, in writing, by all those who submitted bids, then Canada will continue immediately with the evaluation of the bids and its approvals processes.

3. If the extension referred to in paragraph 1.above is not accepted in writing by all those who submitted bids then Canada will, at its sole discretion, either

    a. continue to evaluate the bids of those who have accepted the proposed extension and seek the necessary approvals; or
    b. cancel the invitation to tender.

4. The provisions expressed herein do not in any manner limit Canada's rights in law or under GI11 of R2710T.

SI10 RIGHTS OF CANADA

1. Canada reserves the right to:

    a. Reject any or all bids received in response to the bid solicitation;
    b. Enter into negotiations with bidders on any or all aspects of their bids;
    c. Accept any bid in whole or in part without negotiations;
    d. Cancel the bid solicitation at any time;
    e. Reissue the bid solicitation;
    f. If no compliant bids are received and the requirement is not substantially modified, reissue the bid solicitation by inviting only the bidders who bid to resubmit bids within a period designated by Canada; and
    g. Negotiate with the sole compliant Bidder to ensure best value to Canada.

SI11 LISTING OF SUBCONTRACTORS AND SUPPLIERS

R2710T, GI07 has been amended to the following.

GI07 (2015-02-25) Listing of Subcontractors and Suppliers
The Bidder must submit the names of Subcontractors and Suppliers for the part or parts of the Work listed. See APPENDIX 2. **Failure to do so will result in the disqualification of its bid**.

SI12 BID CHALLENGE AND RECOURSE MECHANISMS

(a) Several mechanisms are available to potential suppliers to challenge aspects of the procurement process up to and including contract award.

(b) Canada encourages suppliers to first bring their concerns to the attention of the Contracting Authority. Canada's Buy and Sell website, under the heading "Bid Challenge and Recourse Mechanisms" contains information on potential complaint bodies such as:

- Office of the Procurement Ombudsman (OPO)
- Canadian International Trade Tribunal (CITT)

(c) Suppliers should note that there are **strict deadlines** for filing complaints, and the time periods vary depending on the complaint body in question. Suppliers should therefore act quickly when they want to challenge any aspect of the procurement process.

SI13 CONSTRUCTION DOCUMENTS

The successful Contractor will be provided (**with 1 electronic or paper copy)** of the sealed and signed drawings, the specifications and the amendments upon acceptance of the offer. Obtaining more copies will be the responsibility of the Contractor including costs.

SI14 WEB SITES

The connection to some of the Web sites in the solicitation documents is established by the use of hyperlinks. The following is a list of the addresses of the Web sites:

Treasury Board Appendix L, Acceptable Bonding Companies
http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=14494&section=text#appL

Buy and Sell
https://www.achatsetventes-buyandsell.gc.ca

Canadian economic sanctions
http://www.international.gc.ca/sanctions/index.aspx?lang=eng

Bid Bond (form PWGSC-TPSGC 504)
http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/504.pdf

Performance Bond (form PWGSC-TPSGC 505)
http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/505_eng.pdf

Labour and Material Payment Bond (form PWGWSC-TPSGC 506)
http://www.tpsgc-pwgsc.gc.ca/app-acq/forms/documents/506.pdf

Standard Acquisition Clauses and Conditions (SACC) Manual
https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R

Declaration Form
http://www.tpsgc-pwgsc.gc.ca/ci-if/formulaire-form-eng.html

Trade agreements
https://buyandsell.gc.ca/policy-and-guidelines/Policy-and-Legal-Framework/Trade-Agreements

R2710T GENERAL INSTRUCTIONS - CONSTRUCTION SERVICES - BID SECURITY REQUIREMENTS (GI) (2021-04-01**)**

The following GI's are included by reference and are available at the following Web Site
https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual/5/R/R2710T/23

GI01 Integrity Provisions - Bid
GI02 Completion of Bid
GI03 Identity or Legal Capacity of the Bidder
GI04 Applicable Taxes
GI05 Capital Development and Redevelopment Charges
GI06 Registry and Pre-qualification of Floating Plant
GI07 Listing of Subcontractors and Suppliers
GI08 Bid Security Requirements
GI09 Submission of Bid
GI10 Revision of Bid
GI11 Rejection of Bid
GI12 Bid Costs
GI13 Procurement Business Number
GI14 Compliance with Applicable Laws
GI15 Approval of Alternative Materials
GI16 Performance Evaluation
GI17 Conflict of Interest-Unfair Advantage
GI18 Code of Conduct for Procurement—bid

CONTRACT DOCUMENTS (CD)

1. The following are the Contract Documents:

   a. Contract Page when signed by Canada;
   b. Duly completed Bid and Acceptance Form and any Appendices attached thereto;
   c. Drawings and Specifications;
   d. General Conditions and clauses

GC1	General Provisions – Construction Services	R2810D	(2017-11-28);

   Subsection GC1.22 Performance-evaluation: incorporated by reference above, is amended as follows:
   Delete: in its entirety
   Insert: GC1.22 Intentionally left blank.

GC2	Administration of the Contract	R2820D	(2016-01-28);
GC3	Execution and Control of the Work	R2830D	(2019-11-28);
GC4	Protective Measures	R2840D	(2008-05-12);
GC5	Terms of Payment	R2850D	(2019-11-28);
GC6	Delays and Changes in the Work	R2860D	(2019-05-30);
GC7	Default, Suspension or Termination of Contract	R2870D	(2018-06-21);
GC8	Dispute Resolution	R2880D	(2019-11-28);
GC9	Contract Security	R2890D	(2018-06-21);
GC10	Insurance	R2900D	(2008-05-12);
	Allowable Costs for Contract Changes Under GC6.4.1	R2950D	(2015-02-25);

   e. Supplementary Conditions
   f. Any amendment issued or any allowable bid revision received before the date and time set for solicitation closing;
   g. Any amendment incorporated by mutual agreement between Canada and the Contractor before acceptance of the bid; and
   h. Any amendment or variation of the contract documents that is made in accordance with the General Conditions.

2. The documents identified by title, number and date above are incorporated by reference and are set out in the Standard Acquisition Clauses and Conditions (SACC) Manual, issued by Public Works and Government Services Canada (PWGSC). The SACC Manual is available on the PWGSC Web site: https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual

3. The language of the contract documents is the language of the Bid and Acceptance Form submitted.

SUPPLEMENTARY CONDITIONS (SC)

SC01 SECURITY CLEARANCE REQUIREMENTS, DOCUMENT SAFEGUARDING

There is no security requirement applicable to this Contract.

SC02 LIMITATION OF LIABILITY

GC1.6 of R2810D is deleted and replaced with the following:

GC1.6 Indemnification by the Contractor

1. The Contractor shall indemnify and save Canada harmless from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by Canada or in respect of claims by any third party, brought or prosecuted and in any manner based upon, arising out of, related to, occasioned by, or attributable to the activities of the Contractor in performing the Work, provided such claims are caused by the negligent or deliberate acts or omissions of the Contractor, or those for whom it is responsible at law.

   The Contractor's obligation to indemnify Canada for losses related to first party liability shall be limited to:

   a. In respect to each loss for which insurance is to be provided pursuant to the insurance requirements of the Contract, the Commercial General Liability insurance limit for one occurrence as referred to in the insurance requirements of the Contract .

   b. In respect to losses for which insurance is not required to be provided in accordance with the insurance requirements of the Contract, the greater of the Contract Amount or $5,000,000, but in no event shall the sum be greater than $20,000,000.

2. The limitation of this obligation shall be exclusive of interest and all legal costs and shall not apply to any infringement of intellectual property rights or any breach of warranty obligations.

3. The Contractor's obligation to indemnify Canada for losses related to third party liability shall have no limitation and shall include the complete costs of defending any legal action by a third party. If requested by Canada, the Contractor shall defend Canada against any third party claims.

4. The Contractor shall pay all royalties and patent fees required for the performance of the Contract and, at the Contractor's expense, shall defend all claims, actions or proceedings against Canada charging or claiming that the Work or any part thereof provided or furnished by the Contractor to Canada infringes any patent, industrial design, copyright trademark, trade secret or other proprietary right enforceable in Canada.

5. Notice in writing of a claim shall be given within a reasonable time after the facts, upon which such claim is based, became known.

SC03 INSURANCE TERMS

1) Insurance Contracts

(a) The Contractor must, at the Contractor's expense, obtain and maintain insurance contracts in accordance with the requirements of the Certificate of Insurance. Coverage must be placed with an Insurer licensed to carry out business in Canada.

(b) Compliance with the insurance requirements does not release the Contractor from or reduce its liability under the Contract. The Contractor is responsible for deciding if additional insurance coverage is necessary to fulfill its obligation under the Contract and to ensure compliance with any applicable law. Any additional insurance coverage is at the Contractor's expense, and for its own benefit and protection.

2) Period of Insurance

(a) The policies required in the Certificate of Insurance must be in force from the date of contract award and be maintained throughout the duration of the Contract.

(b) The Contractor must be responsible to provide and maintain coverage for Products/Completed Operations hazards on its Commercial General Liability insurance policy, for a period of six (6) years beyond the date of the Certificate of Substantial Performance.

3) Proof of Insurance

(a) Before commencement of the Work, and no later than thirty (30) days after contract award, the Contractor must deposit with Canada a Certificate of Insurance on the form attached herein.

(b) Upon request by Canada, the Contractor must provide originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Certificate of Insurance.

4) Insurance Proceeds

In the event of a claim, the Contractor must, without delay, do such things and execute such documents as are necessary to effect payment of the proceeds.

5) Deductible

The payment of monies up to the deductible amount made in satisfaction of a claim must be borne by the Contractor.

SC04 TYPES AND AMOUNTS OF CONTRACT SECURITY

Remove and Replace GC9.2.2. with the following

A performance bond (form PWGSC-TPSGC 505) and a labour and material payment bond (form PWGSC-TPSGC 506) referred to in subparagraph 1)(a) of GC9.2 shall be in a form and be issued by a bonding or surety company (see Treasury Board Appendix L, *Acceptable Bonding Companies*) that is approved by Canada. They can be in the form of Signed and Sealed paper version OR electronic digital version.

Electronic digital versions must meet the following;

1. A performance bond and a labour and material payment bond may be submitted in an electronic or digital format if it meets the following criteria:

   1.1. The versions submitted by the Contractor must be verifiable by Canada with respect to the totality and wholeness of the bonds form, including: the content; all digital signatures; all digital seals; with the Surety Company, or an approved verification service provider of the Surety Company.

   1.2. The versions submitted must be viewable, printable and storable in standard electronic file formats compatible with Canada, and in a single file. Allowable formats include pdf.

   1.3. The verification may be conducted by Canada immediately or at any time during the life of the bonds and at the discretion of Canada with no requirement for passwords or fees.

   1.4. The results of the verification must provide a clear, immediate and printable indication of pass or fail regarding Item 1.1.

2. Bonds failing the verification process will NOT be considered to be valid.

BID AND ACCEPTANCE FORM (BA)
Dust removal corrections to building 76 at AAFC Sherbrooke RDC

BA02 LEGAL NAME AND ADDRESS OF BIDDER

Legal Name:					
Operating Name (if any):					
Address:					
Telephone:		Fax:		PBN:	
E-mail address:					
Contract Security Program Organisation Number (when required)					

BA03 THE OFFER

The Bidder offers to Canada to perform and complete the Work for the above named project in accordance with the Bid Documents for the Total Bid Amount of

$ _____excluding Applicable Taxe(s).
(amount in numbers)

BA04 BID VALIDITY PERIOD
The bid must not be withdrawn for a period of 30 days following the date of solicitation closing.

BA05 ACCEPTANCE AND CONTRACT
Upon acceptance of the Bidder's offer by Canada, a binding Contract will be formed between Canada and the Bidder. The documents forming the Contract will be the Contract Documents identified in "Contract Documents (CD)" section.

BA06 CONSTRUCTION TIME

The Contractor must perform and complete the Work on, or before January 15, 2025.

BA07 BID SECURITY
The Bidder must enclose bid security with its bid in accordance with GI08 - Bid Security Requirements of R2710T - General Instructions - Construction Services - Bid Security Requirements.

BA08 SIGNATURE

Name and title of person authorized to sign on behalf of Bidder (Type or print)

Signature

Date

SPECIFICATIONS AND PLANS

(following page)

Agriculture et Agroalimentaire Canada
Agriculture and Agri-Food Canada
Canada

MECHANICAL AND ELECTRICAL SPECIFICATIONS

TITLE:	**Corrective dusting of feed preparation areas at the dairy complex (building #76)**
LOCATION :	**Sherbrooke Research and Development Center** **2000 College Street, Sherbrooke, J1M 0C8**
Nº . FILE :	**01755-240319**
DATE:	**2024-02-02**
EMISSION :	**For tender**

SUMBIT TO:
AGRICULTURE AND AGRI-FOOD CANADAGÉSTIONNAIRE
JEROME BOUTIN
PRJECT MANAGER B013

A separate bid must be submitted to the BSDQ for each of the following specialties:

1. HVAC system testing, adjustment and balancing	E
2. Fire fighting	G
3. Plumbing	P
4. Heating-cooling	C
5. Refrigeration	F
6. Ventilation and air conditioning	V
7. Automatic control	R
8. Electricity	EL

We have allocated the different specification sections according to the scope of work of each specialty. The letter "T" refers to all specialties for the parts applicable to their work.

SECTION	SUBJECT	SPECIALTIES COVERED BY THE SECTION
Division 01 - GENERAL REQUIREMENTS		
01 14 00	Restriction on work	T
01 33 00	Documents and samples to be submitted	T
01 35 29 _06	SST	T
01 61 00	General product requirements	T
01 74 21	Waste management and disposal	T
DIVISION 21 - MECHANICAL ENGINEERING		
21 05 01	Mechanical engineering - General requirements for work results	T
DIVISION 23 - HEATING, VENTILATION AND AIR CONDITIONING		
23 05 00.01	Heating-cooling - General requirements for work results	C
23 05 00.03	Ventilation - General requirements for work results	V
23 05 05	Pipe installation	C
23 05 13	General requirements for HVAC motors	T
23 05 19.01	Pipe thermometers and pressure gauges	C
23 05 29	Pipe and appliance supports and hangers	C
23 05 49.01	Earthquake protection systems	T
23 05 53.01	Identification of networks and mechanical devices	T
23 05 93	Testing, adjusting and balancing HVAC systems	E
23 05 94	Pressure testing of ventilation systems	E
23 07 13	Thermal insulation for air ducts	V
23 11 23	Natural gas piping for installation	C
23 31 13.01	Metal air ducts - Low pressure, up to 500 Pa	V
23 31 13.02	Metal air ducts, high-pressure, up to 2500 pa	V
23 33 00	Accessories for air ducts	V
23 33 14	Balancing registers	V
23 33 15	Setting registers	V
23 34 00	Fans for HVAC systems	V
23 82 39	Unit heaters and air-convectors	C

List of plans - Mechanics

List of plans - Electrical

Consultant responsible for plans and specifications: for Tender
Francis Boucher, Eng. Building Mechanics Team Leader OIQ # 5048160
Jean-Pascal Durivage, Eng. Building Electrical Team Leader OIQ # 5027232
WSP

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Not applicable

1.2 GENERALITY

.1 SPECIAL ACCESS AND WORKING HOURS REQUIREMENTS
.1 The Contractor shall take into consideration that the building is occupied and will remain so throughout the work period. In order to minimize disruption to occupants, the Contractor shall agree with the Owner on a work schedule (12h to 20h) and intervention plan to enable him to inform the occupants.
.2 Work must be carried out within the schedule (noon to 8 p.m.) defined in the owner's general conditions.
.3 A 48-hour notice is required for system shutdowns; system service interruptions will not be permitted during the customer's operating hours.
.4 Submit work schedule - Bar charts (GANTT).
.5 Ensure that the Contractor's personnel working on the site are familiar with and comply with regulations, including fire, traffic and workplace safety regulations.
.6 Remain within the limits of the works and access roads.
.7 SMOKE-FREE ENVIRONMENT
.8 Respect no-smoking rules. The building affected by this work is a non-smoking building.

1.3 SECURITY CLEARANCES

.1 This provision applies to access to 2000 rue Collège, Sherbrooke, Quebec.

.2 This does not apply at street level. Access to the main construction area must be monitored by the client department (ACC).

.3 All personnel hired for this project who require access to the building will undergo a security check for which a Reliability Status will be required. Obtain the necessary authorizations, as required, for all persons who need to enter the premises.

.4 The general contractor is responsible for completing the employee list for authorization validation purposes. This list must be submitted 72 hours in advance for access coordination.

.5 Access to the building for all personnel will be controlled by the Ministry Representative.
.1 For workers entering the building:

.1 At the start of each shift, all staff are required to present photo ID in exchange for a building pass.
.2 Passes must be worn at all times.
.3 At the end of each shift, building passes must be returned to obtain personal photo ID prior to check-out.
.4 Access logs will not be available for use as time/presence data.

.2 Passes are not required for workers who do not enter the building.

.6 Submit documents required by the relevant occupational health and safety board immediately after contract award.

PART 2 - PRODUCTS

2.1 NO OBJECT

.1 Not applicable.

PART 3 - EXECUTION

3.1 NO OBJECT

.1 Not applicable.

END OF SECTION

PARTIE 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Sections 21 05 01, 23 05 00.01 and 23 05 00.03.

1.2 ADMINISTRATIVE PROCEDURES

.1 As soon as possible and in a predetermined order so as not to delay the execution of the work, submit the required documents and samples to the Consultant for review. Delay in this respect shall not constitute sufficient grounds for an extension of the time for completion of the work, and no such request will be accepted.

.2 Do not undertake any work requiring the submission of documents and samples until the review of all submitted documents has been completed.

.3 Specifications shown on shop drawings, data sheets and samples of products and structures must be expressed in metric (SI) units.

.4 Where items are not produced or manufactured in metric (SI) units, or where specifications are not given in metric (SI) units, converted values may be accepted.

.5 Review documents and samples prior to submission to the Consultant. By this preliminary check, the Contractor confirms that the requirements applicable to the work have been or will be determined and verified, and that each document and sample submitted has been examined and found to conform to the requirements of the work and the contract documents. Documents and samples that are not stamped, signed, dated and identified in relation to the particular project will be returned without being examined and will be considered rejected.

.6 Advise the Consultant in writing, at the time of submission of documents and samples, of any deviations therefrom and of the reasons therefor.

.7 Ensure the accuracy of on-site measurements in relation to adjacent structures affected by the work.

.8 The fact that the documents and samples submitted are examined by the Consultant in no way relieves the Contractor of his responsibility to submit documents that are complete, accurate and in conformity with the requirements of the contract documents.

.9 Keep a verified copy of each document submitted on site.

1.3 SHOP DRAWINGS AND TECHNICALDATA SHEETS

.1 The term "shop drawings" means drawings, schematics, illustrations, tables, performance charts, pamphlets and other documentation to be provided by the Contractor to show in detail any part of the subject work.

.2 Drawings must bear the seal and signature of a qualified engineer recognized or licensed to practice in Canada, in the province of Quebec.

.3 Shop drawings should indicate the materials to be used and the methods of construction, fixing or anchoring to be employed, and should contain assembly diagrams, details of connections, relevant explanatory notes and any other information necessary for the execution of the work. Where structures or components are connected or joined to other structures or components, indicate on the drawings that the requirements have been coordinated, regardless of the section under which the adjacent structures or components are to be supplied and installed. Cross-reference specifications and preliminary drawings.

.4 Allow three days for the Consultant to review each batch of documents submitted.

.5 Changes made to shop drawings by the Consultant are not intended to vary the contract price. If this is the case, however, notify the Consultant in writing before commencing work.

.6 Make changes to shop drawings as requested by the Consultant in accordance with the requirements of the contract documents. When resubmitting the drawings, advise the Consultant in writing of any changes made in excess of those required.

.7 Documents submitted must be accompanied by a letter of transmittal containing the following information:
.1 the date;
.2 project designation and number;
.3 Contractor's name and address;
.4 the designation of each drawing, data sheet and sample as well as the number submitted;
.5 any other relevant data.

.8 Documents submitted must bear or indicate the following:
.1 preparation and revision dates;
.2 project designation and number;
.3 the name and address of the following persons :
.1 the subcontractor;
.2 the supplier;
.3 the manufacturer;

.4 the Contractor's stamp, signed by the Contractor's authorized representative, certifying that the documents submitted have been approved, that the measurements taken on site have been verified and that everything conforms to the requirements of the contract documents;

.5 the relevant details for the sections of work concerned:

.1 materials and manufacturing details;

.2 layout or configuration, with dimensions, including those taken on site, as well as clearances and clearances;

.3 installation or adjustment details;

.4 characteristics such as power, flow rate or capacity;

.5 performance characteristics;

.6 reference standards;

.7 operating mass;

.8 wiring diagrams;

.9 single-line diagrams and schematic diagrams;

.10 links with adjacent structures.

.9 Distribute copies of the shop drawings and data sheets once the Consultant has completed verification.

.10 Submit shop drawings as prescribed in the technical sections of the specifications and as reasonably required by the Consultant.

.11 If no shop drawing is required due to the use of a standard manufacturing product, submit technical data sheets or manufacturer's documentation prescribed in the technical sections of the specifications and required by the Consultant.

.12 Submit test reports prescribed in the technical sections of the specifications and required by the Consultant.

.1 The report signed by the official representative of the testing laboratory must certify that materials, products or systems identical to those proposed as part of the work have been tested in accordance with the prescribed requirements.

.2 The tests must have been carried out within the three (3) years preceding the contract award date.

.13 Submit six (6) electronic copies of the certificates prescribed in the technical sections of the specifications and required by the Consultant.

.1 The documents, printed on the manufacturer's official correspondence paper and signed by a representative of the manufacturer, must certify that the products, materials, equipment and systems supplied comply with the specifications.

.2 Certificates must bear a date subsequent to the award of the contract and indicate the project designation.

.14 Submit six (6) electronic copies of the manufacturer's instructions prescribed in the technical sections of the specifications and required by the Ministry Representative.

.1 Pre-printed documents describing how to install products, materials and systems, including special instructions and data sheets indicating impedances, risks and safety measures to be taken.

.15 Submit six (6) electronic copies of the manufacturer's on-site inspection reports prescribed in the technical sections of the specifications and required by the Ministry Representative.

.16 Reports of tests and verifications carried out by the manufacturer's representative to confirm the conformity of installed products, materials, equipment or systems with the manufacturer's instructions.

.17 Submit six (6) electronic copies of the operation and maintenance sheets prescribed in the technical sections of the specifications and required by the Ministry Representative.

.18 Delete information that doesn't apply to the job.

.19 In addition to the standard information, provide any additional details that apply to the work.

.20 When the shop drawings have been checked by the Consultant and no errors or omissions have been found, or only minor corrections have been made, the annotated drawing is returned, and shaping and installation work can then begin. If the shop drawings are rejected, the annotated copy(ies) are returned, and the corrected shop drawings must be resubmitted as described above before shaping and installation work can begin.

1.4 CERTIFICATES AND MINUTES

.1 Submit documents required by the relevant occupational health and safety board immediately after contract award.

PARTIE 2 - PRODUCTS

2.1 NO OBJECT

.1 Not applicable.

PARTIE 3 - EXECUTION

3.1 NO OBJECT

.1 Not applicable.

END OF SECTION

PARTIE 1- GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 21 05 01.

1.2 REFERENCES

.1 Canada Labour Code, Part II, Canada Occupational Safety and Health Regulations

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.3 Province of Quebec
.1 Act respecting occupational health and safety, R.S.Q.

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit the required documents and samples in accordance with section 01 33 00 - Documents and samples to be submitted.

.2 Submit, no later than seven (7) days after the date of service of the work order and before mobilization of the workforce, a health and safety plan drawn up specifically for the worksite and including the following elements.
.1 Results of site-specific risk/safety assessment.
.2 Results of an analysis of the health and safety risks or hazards associated with each task and activity.

.3 Submit copies of guidelines or reports prepared by federal or provincial health and safety inspectors.

.4 Submit copies of incident and accident reports.

.5 Submit WHMIS Material Safety Data Sheets (MSDS) in accordance with Section 01 47 15 - Sustainable Development - Construction and Section 02 81 01 - Hazardous Materials.

The Consultant will review the health and safety plan prepared by the Contractor for the worksite and provide comments within 3 days of receipt. If necessary, the Contractor will revise his health and safety plan and resubmit it to the Consultant no later than 3 days after receipt of the Consultant's comments.

.6 The Consultant's review of the final health and safety plan prepared by the Contractor for the site shall not be construed as an approval of such plan and shall in no way limit the Contractor's overall responsibility for health and safety during construction.

.7 Medical surveillance: Where required by law, regulation or safety program, submit certification of medical surveillance of personnel working on the site before starting work.

.8 Emergency response plan: set out the procedures and steps to be taken in the event of an emergency on site.

1.4 PRODUCTION OF PROJECT NOTICE

.1 Before work begins, send the project notice to the appropriate provincial authorities.

1.5 RISK/HAZARD ASSESSMENT

.1 Conduct an assessment of the safety risks/hazards present on this site as they relate to the execution of the work.

1.6 MEETINGS

.1 Organize and lead a health and safety meeting with the Consultant prior to the start of work.

1.7 RESPONSIBILITY

.1 Assume responsibility for the health and safety of people working on the site, as well as for the protection of property located on the site; also assume responsibility, in areas adjacent to the site, for the protection of people and the environment insofar as they are affected by the work.

.2 Comply with, and have employees comply with, the safety requirements set forth in applicable local, territorial, provincial and federal contract documents, ordinances, laws and regulations, as well as in the health and safety plan prepared for the job site.

1.8 COMPLIANCE REQUIREMENTS

.1 Comply with the Act respecting occupational health and safety and the Regulation respecting industrial and commercial establishments, R.R.Q.

.2 Comply with the Occupational Health and Safety Regulations under the Canada Labour Code.

1.9 UNFORESEEN RISKS/HAZARDS

.1 In the event of special or unforeseen conditions, risks/hazards or factors affecting safety during the performance of the work, observe the procedures in place regarding the employee's right to refuse unsafe work, in accordance with provincial laws

and regulations, and inform the Consultant orally and in writing.

1.10 GENERAL REQUIREMENTS

.1 Before undertaking the work, prepare a site-specific prevention program based on the hazards identified according to the article “HAZARD ASSESSMENT” and the article “RISKS INHERENT TO THE WORKSITE” in this section. Apply this program in its totality from the start of the project until demobilization of all personnel from the construction site. The prevention program shall take into consideration the specific characteristics of the project and cover all the work to be executed on the construction site.

The safety program must include at least the following:

.1 company safety and health policy;
.2 description of the stages of the work;
.3 total costs, schedule and projected workforce curves;
.4 flow chart of safety and health responsibilities;
.5 physical and material layout of the construction site;
.6 risk assessment for each stage of the work, including preventive measures and the procedures for applying them;
.7 identification of the preventive measures relative to the specific risks inherent to the worksite indicated in the article “RISKS INHERENT TO THE WORKSITE”;
.8 identification of preventive measures for health and safety of employees and / or public works site as indicated in the article “SPECIFIC REQUIREMENTS FOR THE HEALTH AND SAFETY OF OCCUPANTS AND PUBLIC”;
.9 training requirements;
.10 procedures in case of accident/injury;
.11 written commitment from all parties to comply with the safety program;
.12 construction site inspection cheklist based on the preventive measures;
.13 emergency response plan which shall contain at least the following:

.1 construction site evacuation procedures;

.2 identification of resources (police, firefighters, ambulance services, etc.);

.3 identification of persons in charge of the construction site;

.4 identification of the first-aid attendants;

.5 communication organizational chart (including the person responsible for the site and the Departmental representative);

.6 training required for those responsible for applying the plan;

.7 any other information needed, in the light of the construction site's characteristics.

If available the Departmental representative will provide the evacuation procedures to the Contractor who shall then coordinate the construction site procedure with that of the site and submit it to the Departmental representative.

.2 Departmental representative may respond in writing, where deficiencies or concerns are noted in the prevention program and may request resubmission with correction of deficiencies or concerns.

.3 In addition to the prevention program, during the course of the work the Contractor shall elaborate and submit to the Departmental representative specific written procedures for any work having a high risk factor of accident (for example: demolition procedures, specific installation procedures, hoisting plan, procedures for entering a confined space, procedures for interrupting electric power, etc.) or at the request of the Departmental representative.

.4 The Contractor shall plan and organize work so as to eliminate the danger at source or ensure collective protection, thereby minimizing the use of personal protective equipment.

.5 Equipment, tools and protective gear which cannot be installed, fitted or used without compromising the health or safety of workers or the public shall be deemed inadequate for the work to be executed.

.6 All mechanical equipment (for example, but not limited to: hoisting devices for persons or materials, excavators, concrete pumps, concrete saws) shall be inspected before delivery to the construction site. Before using any mechanical equipment, the Contractor shall obtain a certificate of compliance signed by a qualified mechanic dated less than a week prior to the arrival of each piece of equipment on the construction site; the certificate shall remain on the construction site and transmitted to the Departmental representative on demand.

.7 Ensure all inspections (daily, periodic, annual, etc.) for the hoisting devices for persons or materials required by the current standards are carried out and be able to provide a copy of the inspection certificates to the Departmental representative on demand.

.8 The Departmental representative can at all times, if he suspects a malfunction or the risk of an accident, order the immediate stop of any piece of equipment and require an inspection by a specialist of his choice.

.9 The Departmental representative must be consulted for the location of storing gas cylinders and tanks on the construction site.

1.11 DOCUMENT DISPLAY

.1 Ensure that all relevant documents, articles, orders and notices are posted in a prominent place on site, in accordance with provincial laws and regulations, and in consultation with the Consultant.

1.12 CORRECTIVE ACTION IN THE EVENT OF NON-COMPLIANCE

.1 Immediately take the necessary measures to correct any situations deemed to be non-compliant, in terms of health and safety, by the competent authority or by the Consultant.

.2 Provide the Consultant with a written report of actions taken to correct any health and safety non-compliance.

.3 The Consultant may order the work to be stopped if the Contractor fails to take the necessary corrective action with regard to conditions deemed to be non-compliant in terms of health and safety.

1.13 CARTRIDGE DEVICES

.1 Use cartridge devices only with the written permission of the Consultant.

1.14 LOCKOUT-TAGOUT

.1 For all work on electrically or otherwise energized equipment, the Contractor shall draw up and implement a general lockout-tagout procedure and submit it to the Departmental representative.

.2 Supervisors and all workers concerned by work requiring lockout-tagout must have received training on lockout-tagout procedures by a recognized organization; Contractor shall submit training certificates to the Departmental representative.

.3 Before starting the lockout-tagout procedure of a piece of equipment on an occupied site, Contractor must coordinate his work with the representative of the site if the interruption of the power sources can have an impact on the operations of the site or on its occupants.

.4 Contractor must designate a qualified person as responsible for the lockout-tagout and must make sure that that person prepares a lockout-tagout data sheet for each piece of equipment involved. The lockout-tagout data sheet must be submitted to the Departmental representative at least 48

hours before the beginning of the work. The Departmental representative will review the data sheet with the representative of the site if the work takes place in an existing building. The data sheets for lockout-tagout must contain at least the following information:

.1 description of work to carry out;

.2 identification, description and location of the circuit and/or piece of equipment to lockout-tagout;

.3 identification of energy sources that feeds the piece of equipment;

.4 identification of each cutout point;

.5 sequence of lockout-tagout and the release of residual energy as well as the sequence of unlocking;

.6 list of material needed for the lockout-tagout;

.7 method of verification of zero energy implementation;

.8 name and signature of the person who prepared the data sheet.

When required by the Departmental representative, Contractor must record all this information on the site's representative form.

.5 At the time of lockout-tagout, the person responsible must date the data sheet and ensure that each worker involved in the work on the circuit/~~piece of~~ equipment to lockout-tagout puts his name on the data sheet and signs it.

1.15 ELECTRICAL WORK

.1 Contractor shall ensure that all electrical work is executed by qualified employees in accordance with the provincial regulation respecting vocational training and qualification.

.2 Contractor shall respect all requirements of standard CSA Z462 *Workplace Electrical* Safety Standard.

.3 No repairs or alterations shall be carried out on any live equipment except where complete disconnection of the equipment is not feasible.

.4 Contractor shall respect all requirements prescribed in paragraph "LOCKOUT-TAGOUT" in this section.

.5 Contractor shall advise in writing the Departmental representative of all the work that cannot be done with de-energized equipment and obtain his authorization. Contractor shall demonstrate to the Departmental representative that it is impossible to do the work with de-energized equipment and provide all the information necessary to request and obtain an energized electrical work permit (indicate working procedures, arc flash hazard analysis, protective perimeter, protective equipment, etc.) before the beginning of the work, excluding for the exceptions indicated in standard CSA Z462 Workplace electrical safety.

.6 The energized electrical work permit on must contain at least the following elements:

- description of the circuit and equipment and its location;
- justification for having to do the work in an energized condition;
- description of safe work practices to apply;
- results of the shock hazard analysis;
- limit of the protective perimeter against electric shocks;
- results of the arc flash hazard analysis;
- description of the arc flash protection boundary;
- description of the personal protective equipment required;
- description of the means to limit access to unqualified persons;
- proof that an information session has been carried out;
- approval signature of the energized electrical work (by a person in authority or by the owner).

.7 If for the operational requirements of the occupants of the site the representative of the site requires that the Contractor performs work in an energized condition, the Contractor shall obtain all the information required to request and obtain obtain an energized electrical work permit (indicate working procedures, arc flash hazard analysis, protective perimeter, protective equipment, etc.) and have it signed by the representative of the site assigned by the Departmental representative before the beginning of the work.

1.16 RESPIRATORORY PROTECTION

.1 Contractor must ensure that all workers who must wear a respirator as part of their duties have received training for that purpose as well as fit testing of their respirator, in accordance with CSA Standard Z94.4 *Selection, use and care of respirators.* Submit the certificates of the fit testing**S** to the Departmental representative on demand.

1.17 FALL PROTECTION

.1 Plan and organize work so as to eliminate the risk of fall at the source or ensure collective protection, thereby minimizing the use of personal protective equipment. When personal fall protection is required, workers must use a safety harness that complies with CSA standard CAN/CSA Z-259.10 M90. A safety belt must not be used as fall protection.

.2 Every person using an elevating platform (scissors, telescopic mast, articulated mast, rotative mast, etc.) must have a training regarding this equipment.

.3 The use of a safety harness is mandatory for all elevating platforms with telescopic, articulate or rotative mast.

.4 Define the limits of the danger zone around each elevating platform.

.5 All openings in a floor or roof must be surrounded by a guardrail or provided with a cover fixed to the floor able to withstand the loads to which it could be exposed, regardless of the size of the opening and the height of the fall it represents.

.6 Everyone who works within two metres from a fall hazard of three metres or more must use a safety harness in accordance with the requirements of the regulation, unless there is a guardrail or another device offering an equivalent safety.

.7 Despite the requirements of the regulation, the Departmental representative may require the installation of a guardrail or the use of a safety harness for specific situations presenting a risk of fall less than three metres.

1.18 SCAFFOLDINGS

In addition to the requirements of the *Code de sécurité pour les travaux de construction* (Safety code for the construction industry), the Contractor who uses scaffoldings must respect the following requirements:

.1 Foundation

.1 Scaffoldings shall be installed on a solid foundation so that it does not slip or rock.
.2 Contractors wishing to install scaffolding on a roof, overhang, canopy or awning shall submit their calculations and loads, as well as plans signed and sealed by an engineer

to the Departmental representative and obtain his authorization before beginning installation.

.2 Assembly, bracing and mooring

.1 All scaffolding shall be assembled, braced and moored in accordance with the manufacturer's instructions and the provisions of the Code de sécurité pour les travaux de construction (Safety code for the construction industry).
.2 Where a situation requires the removal of part of the scaffolding (e.g., crosspieces), the Contractor shall submit to the Departmental representative an assembly procedure signed and sealed by an engineer certifying that the scaffolding assembled in that manner will allow the work to be done safely given the loads to which it will be subject.
.3 For scaffolding where the span between two supports is greater than three metres, the Contractor shall provide the Departmental representative an assembly plan signed and sealed by an engineer.

.3 Protection against falls during assembly

.1 Workers exposed to the risk of falling more than three metres shall be protected against falls at all times during assembly.

.4 Platforms

.1 Scaffolding platforms shall be designed and installed in accordance with the provisions of the Code de sécurité pour les travaux de construction (Safety code for the construction industry).
.2 If planks are used, they shall be approved and stamped in accordance with section 3.9.8 of the Code de sécurité pour les travaux de construction (Safety code for the construction industry)
.3 Scaffolding of four sections (or six metres) high or more shall have a full platform covering the entire surface between the putlogs every three metres high or fraction thereof, and the components of that platform shall not be moved at any time to create an intermediate landing.

.5 Guardrails

.1 A guardrail shall be installed on every landing.
.2 Cross braces shall not be considered as guardrails.
.3 If the platforms are not covering the entire surface between the putlogs, the guardrail must be installed just above the edge of the platform so that there is no empty horizontal space between the platform and the guardrail.
.4 Where scaffolding has four sections (or six metres) high or more and full platforms are required, the guardrails shall be installed on each landing at the start of work and shall remain in place until the work is completed.

.6 Access

.1 The Contractor shall ensure that access to the scaffolding does not compromise worker safety.
.2 Where the platforms of the scaffolding are comprised of planks, ladders shall be installed in such a way that planks extending beyond the platform do not block the way up or down.
.3 Notwithstanding the provisions of the Code de sécurité pour les travaux de construction (Safety code for the construction industry), stairs shall be installed on all scaffolding that have six or more rows of uprights or is six sections (or nine metres) high or higher.

.7 Protection of the public and occupants

.1 When scaffolding are installed in a zone accessible to the public, the Contractor shall take the necessary measures to prevent the public from having access to them and, if applicable, to the work or storage area located in the vicinity of these scaffolding.
.2 Contractor must install covered walkways, nets or other similar devices to protect workers, the public and the occupants against falling objects. The means of protection must be approved by the Departmental representative

.8 Engineering plans

.1 In addition to those required by the Code de sécurité pour les travaux de construction (Safety code for the construction industry), the Departmental representative reserves the right to require engineering plans for other types or configurations of scaffoldings.
.2 A plan signed and sealed by an engineer is required for all scaffoldings that will be covered with a canvas, a tarpaulin or any other material that has wind resistance.
.3 A certificate of conformity signed by an engineer is required in all cases where an engineering plan is required for the installation and this, before anybody uses the facility. A copy of these documents must be available on the construction site at all times.

1.19

1.20 STOP WORK

.1 Give priority to the health and safety of the public and site personnel, and to environmental protection, over issues related to the cost and schedule of the work.

PARTIE 2 - PRODUCTS

2.1 NO OBJECT

.1 Not applicable.

PARTIE 3 - EXECUTION

3.1 NO OBJECT

.1 Not applicable.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)
.1 CCDC 2, Fixed price contract.
.2 DOC 14, Fixed-price design-build contract.
.3 DOC 15, Contract between design-builder and professional.

.2 Comply with the above standards, in whole or in part, as specified in the specifications.

.3 In cases where there is doubt as to the conformity of certain products or systems to the relevant standards, the Consultant reserves the right to verify this by testing.

.4 If the products or systems comply with the contractual documents, the costs incurred by these tests will nevertheless be borne by the Contractor.

1.2 QUALITY

.1 Products, materials, equipment, appliances and parts used in the execution of the work must be new, in perfect condition and of the highest quality for the purpose for which they are intended. If necessary, provide proof of the nature, origin and quality of the products supplied.

.2 The purchasing policy aims to acquire, at minimum cost, items containing the highest possible percentage of recycled and recovered materials, while maintaining satisfactory levels of competitiveness. Make reasonable efforts to use recycled materials for both the design and execution of work.

.3 Products found to be defective prior to completion of the work will be rejected, regardless of the findings of previous inspections. Inspections are not intended to relieve the Contractor of his responsibilities, but simply to reduce the risk of omission or error. The Contractor will be responsible for the removal and replacement of defective products at his own expense, and will be liable for any resulting delays and costs.

.4 In the event of any dispute as to the quality or suitability of the products, only the Consultant shall be entitled to settle the matter on the basis of the requirements of the contract documents.

.5 Unless otherwise specified in the specifications, promote uniformity by ensuring that materials or components of the same type are sourced from the same manufacturer.

.6 Labels, brand names and permanent nameplates prominently displayed on products are not acceptable, unless they give an

operating instruction or are affixed to equipment installed in mechanical or electrical plant rooms.

1.3 EASE OF PRODUCT PROCUREMENT

.1 Immediately after signing the contract, familiarize yourself with the product delivery requirements and anticipate any delays. If delays in product delivery are foreseeable, notify the Consultant so that steps can be taken to substitute replacement products or to make the necessary corrections, sufficiently in advance so as not to delay the work.

.2 If the Consultant has not been advised of foreseeable delays in delivery at the commencement of the work, and if it appears likely that the performance of the work will be delayed as a result, the Consultant reserves the right to substitute other comparable products which can be delivered more quickly, without increasing the contract price.

1.4 PRODUCT STORAGE, HANDLING AND PROTECTION

.1 Handle and store products in such a way as to avoid damaging, altering or soiling them, and following the manufacturer's instructions where applicable.

.2 Store grouped or batched products in their original packaging; leave packaging, label and manufacturer's seal intact. Do not unpack or untie products before incorporating them into the work.

.3 Products likely to be damaged by the weather should be stored in a weatherproof enclosure.

.4 Hydraulic binders must not be placed directly on the ground or on a concrete floor, nor come into contact with walls.

.5 Sand for incorporation into mortars and grouts must be kept dry and clean. Store on wooden platforms and cover with waterproof tarpaulins in bad weather.

.6 Place lumber, sheet and panel materials on rigid, flat supports, so that they don't rest directly on the ground. Slope slightly to allow condensation water to run off.

.7 Store and mix paint products in a heated, well-ventilated area. Remove oily rags and other flammable waste from work areas daily. Take all necessary precautions to avoid the risk of spontaneous combustion.

.8 Replace damaged products at no extra charge, to the satisfaction of the Consultant.

.9 Touch-up damaged factory-finished surfaces to the satisfaction of the Consultant. For touch-ups, use products

identical to those used for the original finish. Do not apply finishing or touch-up products to nameplates.

1.5 TRANSPORT

.1 Pay transportation costs for products required to complete the work.

.2 The cost of transporting products supplied by the Owner will be borne by the Contractor. Unloading, handling and storage of these products.

1.6 MANUFACTURER 'S INSTRUCTIONS

.1 Unless otherwise stipulated in the specification, install or fit products in accordance with the manufacturer's instructions. Do not rely on labels or containers supplied with products. Obtain a copy of the manufacturer's written instructions directly from the manufacturer.

.2 Notify the Consultant in writing of any discrepancies between the specification requirements and the manufacturer's instructions, so that he can take appropriate action.

.3 If the manufacturer's instructions have not been complied with, the Consultant may demand, without increasing the contract price, the removal and re-installation of products which have been incorrectly placed or installed.

1.7 QUALITY OF WORKMANSHIP

.1 The work shall be of the highest quality and shall be carried out by tradesmen qualified in their respective disciplines. Advise the Consultant if the work to be performed is such that it is unlikely to achieve the desired results.

.2 Not to employ unqualified persons or persons not qualified to perform the work entrusted to them. The Consultant reserves the right to deny access to the site to any person deemed incompetent or negligent.

.3 Only the Consultant can settle disputes concerning the quality of workmanship and the skills of the workforce, and his decision is irrevocable.

1.8 COORDINATION

.1 Ensure that workers cooperate with each other to complete the work. Keep a close and constant watch on their work.

.2 It is the Contractor's responsibility to coordinate the work and to install the bushings, sleeves and accessories.

1.9 ITEMS TO CONCEAL

.1 Unless otherwise specified, conceal electrical ducts, conduits and cables in floors, walls and ceilings of finished rooms and areas.

.2 Before concealing elements, inform the Consultant of any abnormal situation. Install according to the Consultant's instructions.

1.10 REHABILITATION

.1 Carry out remedial work required to repair or replace defective or unacceptable parts or components of the structure. Coordinate work on affected adjacent structures, as required.

.2 Restoration work must be carried out by specialists familiar with the materials and equipment used, and must be carried out in such a way that no part of the structure is damaged or at risk of being damaged.

1.11 DEVICE LOCATION

.1 The location indicated for appliances, sockets and other electrical or mechanical equipment should be regarded as approximate.

.2 Inform the Consultant of any problems that may be caused by the choice of a device location, and proceed with the installation according to his instructions.

1.12 FASTENERS - GENERAL

.1 Unless otherwise specified, supply metal accessories and fasteners with the same texture, color and finish as the element to be fastened.

.2 Avoid electrolytic action between dissimilar metals or materials.

.3 Unless stainless steel or other fasteners are specified in the relevant section of the specifications, use corrosion-proof, hot-dipped galvanized steel fasteners and anchors to secure exterior structures.

.4 Anchor spacing must be determined taking into account limit loads and shear strength, to ensure a permanent free anchorage. Anchors made of wood or any other organic material are not acceptable.

.5 Use as few exposed fasteners as possible; space them evenly and install them with care.

.6 Fasteners that could cause spalling or cracking of the element in which they are anchored will be rejected.

1.13 FASTENERS - MATERIALS

.1 Use fasteners of standard commercial shapes and sizes, made of suitable material and finished to suit the intended use.

.2 Unless otherwise specified, use sturdy, semi-fine-grade, hexagonal-head fasteners. Use grade 304 stainless steel for outdoor installations.

.3 Bolt shanks must not extend beyond the top of the nuts by more than their diameter.

.4 Use ordinary washers on devices and equipment, and sheet metal lock washers with soft inserts where vibration is likely to occur. Use resilient washers to secure devices and equipment to stainless steel components.

1.14 PROTECTION OF WORKS IN PROGRESS

.1 Do not overload any part of the building. Unless otherwise specified, obtain written authorization from the Consultant before cutting, drilling or sleeving any framing member.

1.15 EXISTING UTILITY NETWORKS

.1 Where connections are to be made to existing networks, they must be carried out at the times specified by the competent local authorities, with the least possible disruption to the progress of the work, to the occupants of the building or to pedestrian and vehicular traffic.

.2 Protect, relocate or maintain functional utility lines. If pipes are discovered during work, seal them off in a manner approved by the responsible authorities, locate the sealing points and record them.

PART 2 - PRODUCTS

2.1 NO OBJECT

.1 Not applicable.

PART 3 - EXECUTION

3.1 NO OBJECT

.1 Not applicable.

END OF SECTION

PART 1 - GENERAL

1.1 WASTE MANAGEMENT OBJECTIVES

.1 Before work begins, meet with the Consultant to review the waste management plan and objectives.

.2 The federal government's waste management target is to reduce the total flow of construction/demolition waste to landfill by 90 percent. Provide the Consultant with documentation certifying that comprehensive measures and procedures for waste management, recycling and reuse of recyclable and reusable materials have been implemented.

.3 Maximum control of solid construction waste.

.4 Protect the environment and prevent pollution and environmental impacts.

1.2 REFERENCES

.1 Canada Green Building Council (CaGBC), Green Building Rating System for New Construction and Major Renovations, LEED Canada-NC, version 1.0.

1.3 DEFINITIONS

.1 Class III non-hazardous materials: Construction, renovation and demolition waste.

.2 Landfill - inert waste: bituminous materials and concrete only.

.3 Source separation program (PTDS): On-site sorting of reusable/recyclable and recyclable waste to ensure that it is classified in the appropriate categories.

.4 Recyclability: Characteristic of a product or material that can be recovered at the end of its life cycle and transformed into a new product for reuse.

.5 Recycling: The process of collecting or transforming waste and used materials so that they can be reintroduced into the consumer cycle as new products.

.6 Recycling: Operations encompassing the sorting, cleaning, treatment and reconstitution of solid waste and other discarded materials, designed to promote their use in a form different from their original state. Recycling does not include the combustion, incineration or thermal destruction of waste.

.7 Reuse: Repeated use of a product or material in its original form, for a different purpose in the case of reuse, and for a

similar purpose in the case of re-use. Reuse includes the following:
.1 The recovery of products and materials that can be reused/employed, generated by modernization work on a structure or work, prior to demolition, for resale, reuse, re-employment within the same project or storage for later use.
.2 The return to suppliers of products and materials that can be reused/repurposed, such as pallets and unused products.

.8 Reclamation: Removal of load-bearing and non-load-bearing building components and materials during the deconstruction or dismantling of industrial, commercial or institutional structures, with a view to their reuse or recycling.

.9 Sorted waste: Waste already classified by type.

.10 Source separation: Separation of different types of products and waste materials from the moment they become waste.

.11 Waste Management Coordinator (WMC): Contractor's representative responsible for overseeing waste management activities and coordinating requirements for reports, documents and samples to be submitted.

1.4 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit the required documents and samples, in accordance with section 01 33 00 - Documents and samples to be submitted.

.2 Submit, prior to final payment, a summary of waste recovered for reuse, recycling or disposal.
.1 Failure to submit the prescribed summary may result in withholding of final payment.
.2 Provide receipts, weight tickets, waybills and quantities and types of waste materials reused/reemployed, collected in a jumble and sorted off-site or disposed of.
.3 For each waste material generated by the project and reused, sold or recycled, indicate the quantity in tonnes or number, type and size, and destination.
.4 For each waste material generated by the project and landfilled or incinerated, indicate the quantity in tonnes and the name of the landfill, incinerator or transfer station.

1.5 SOURCE SEPARATION PROGRAM (PTDS)

.1 Prepare the PTDS before starting work.

.2 Following the methods authorized by the Consultant and with the latter's authorization, implement the PTDS for all waste generated by the work.

.3 Provide site facilities for collecting, handling and storing anticipated quantities of reusable/recyclable waste materials.

.4 Provide containers for reusable/recyclable and recyclable waste materials.

.5 Place containers where they can be easily disposed of without interfering with site activities.

.6 Place sorted waste materials where they will suffer the least possible damage.

.7 Waste materials must be collected, handled and stored on site, then disposed of in sorted condition.
.1 Recovered waste materials must be transported to the approved and authorized recycling facility or to the users of the waste materials to be recycled, as the case may be.

.8 Waste materials must be collected, handled and stored on site, then disposed of unsorted.
.1 Recovered waste materials must be sent to a site operating under a certificate of approval.
.2 Waste materials must be sorted into appropriate categories for reuse or recycling.

1.6 STORAGE, HANDLING AND PROTECTION OF MATERIALS

.1 Recovered waste materials should be stored for reuse/recycling at locations indicated by the Consultant.

.2 Unless otherwise specified, waste materials to be disposed of become the property of the Contractor.

.3 Protect, stack, store and catalog recovered items.

.4 Separate non-recoverable components from recoverable components. Transport and deliver non-recoverable components to authorized disposal facility.

.5 Framing elements left in place, but not demolished, must be protected against displacement and damage.

.6 Support structures affected by the work. If the safety of the building is at risk, stop the work and inform the Consultant immediately.

.7 Protect surface drainage systems from damage or blockage; protect electrical and mechanical installations.

.8 Sort and store waste materials generated by dismantling structures in designated areas.

.9 Prevent contamination of waste materials intended for recovery and recycling, in accordance with the acceptance conditions of designated facilities.
.1 We recommend sorting waste materials at source.
.2 Take waste materials collected in a jumble to an off-site processing facility for sorting.
.3 Provide a bill of lading for sorted waste materials.

1.7 WASTE DISPOSAL

.1 The Government of Canada is working to increase the diversion of waste from construction, renovation and demolition projects. Therefore, we must seek. Wherever possible, waste diversion opportunities for both project and personal waste. Local and regional alternative methods of waste disposal, such as reuse, recycling, recovery and composting, should be used.
.1 Hazardous waste and hazardous materials are excluded from diversion requirements and must be handled and disposed of in accordance with applicable regulations.

.2 The following resources may be helpful in identifying waste diversion opportunities:
.1 Recyclable materials transporters and recycling markets: find out about local transporters and markets for recyclable materials.
.2 Waste-to-energy systems: examine local incentives for waste-to-energy systems where no system exists to divert materials from landfill for reuse or recycling.

.3 All on-site workers must be informed of waste management requirements, such as waste storage and handling, to enable waste diversion.

.4 It is forbidden to bury scraps or waste.

.5 It is forbidden to dispose of waste, volatile matter, mineral spirits, hydrocarbons, paint thinner or any other product in a watercourse or in a storm or sanitary sewer.

.6 Recover scrap materials as deconstruction/dismantling work progresses.

1.8 USE OF PREMISES AND FACILITIES

.1 Carry out the work with minimum disruption to the normal use of the premises.

.2 Maintain the safety measures established for the existing installation or implement interim safety measures approved by the Consultant, as the case may be.

1.9 CONSTRUCTION SCHEDULE

.1 Coordinate waste management with other activities to ensure an orderly workflow.

PART 2 - PRODUCTS

2.1 NO OBJECT

.1 Not applicable.

PART 3 - EXECUTION

3.1 SELECTIVE DEMOLITION

3.2 GENERAL

.1 Carry out work in accordance with the PRD.

.2 Handle waste that cannot be reused/reused, recycled or recovered in accordance with relevant codes and regulations.

3.3 CLEANING

.1 When work is complete, remove tools and dispose of waste. Leave the site clean and tidy.

.2 Clean up the work area as you go along.

.3 Separate waste materials that are to be reused or recycled at source, and place them where indicated.

3.4 WASTE RECYCLING

.1 Based on the list below, sort waste materials from the general waste stream and place them in separate piles or containers, with the Consultant's authorization and in accordance with relevant fire safety regulations.
   .1 Identify containers or storage areas.
   .2 Provide instructions on disposal practices.

.2 The on-site sale of waste materials recovered for reuse/recycling, recovered for recycling, reusable/reusable or recyclable is prohibited.

.3 Demolition waste

Type of waste material	Recommended recovery percentage
Electrical equipment	80
Mechanical equipment	100
Metallic elements	100

.4 Construction waste

Type of waste material	Recommended recovery percentage
Paper/Cardboard	100
Plastic packaging	100
Steel elements	100
Non-ferrous metal components	100

3.5 KEY ENVIRONMENTAL AUTHORITIES IN THE FEDERAL AND PROVINCIAL GOVERNMENTS

.1 Appendix E - Main government environmental authorities

Province	Address	General information	Fax
Quebec	Ministère de l'Environnement et de la Faune, Siège social, 150, boul. East, Quebec, QC G1R 4Y1	418 643-3127 800-561-16 16	418 646-5974
	Treasury Board of Canada Secretariat Strategic Communications and Corporate Affairs 90 Elgin Street, 8th Floor Ottawa, Ontario K1A 0R5	877-636-0656	613-369-9371

END OF SECTION

PARTIE 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 This section covers topics common to all sections of divisions 21, 22, 23 and 25.

.2 All sections of divisions 21, 22, 23 and 25 are therefore included in this section.

.3 The requirements and directives set forth in the general (divisions 00 and 01) and other clauses relevant to the project (sequence of work, services to be maintained, special requirements, etc.) of the architect's and/or owner's documents must be strictly followed by the contractor, whether or not they are incorporated by reference in this section.

1.2 DEFINITION

.1 The word "CONTRACTOR" means the person, company or its successor who undertakes to supply all labor, materials and equipment necessary to perform the work on this project.

.2 The word "Engineers" or "Consultant" means :
WSP Canada Inc.
1135, Boulevard Lebourgneuf
QUÉBEC (Québec) G2K 0M5

.3 The word "OWNER" means :

Agriculture and Agri-Food Canada

.4 Terms
.1 A verb used in the infinitive form, beginning a sentence or a proposition, implies the words "the contractor shall supply, install and connect..." e.g.: to supply and install or to supply or install... will mean: "the contractor shall supply, install and connect all the equipment...".
.2 "INDICATED" means indicated on the drawings or specifications forming part of the contract.
.3 "QUOTATION" means collectively all latest revisions attached to this quotation as well as any additional or revised drawings subsequently provided.
.4 "IN THIS QUOTATION" means the contents of a section or division where this term appears.
.5 The terms "CONTRACTOR" or "PRESENT CONTRACTOR", mentioned in the various specification sections or drawings, refer to the company responsible for the specification section or drawing in which they appear.

1.3 PLANS AND SPECIFICATIONS

.1 A series of drawings showing all the main equipment required accompanies this estimate.

.2 The drawings show, in a general and approximate manner, the location of the equipment and where the pipes, conduits, ducts, etc., installed under this contract will run. The contractor shall make any adjustments required to accommodate architectural or structural constraints, including any deviations of pipes, ducts or sheaths. Only the dimensional drawings will take precedence in the installation of mechanical and electrical work.

.3 Where pipes, ducts, etc., are shown on the plans only in diagrammatic form, they should be installed in such a way as to preserve free space and interfere as little as possible with the use of the space through which they will pass.

.4 The contractor must therefore ask the architect and engineer for any clarifications required before submitting his bid. In addition, he shall notify the engineer of any discrepancies that may exist between the engineer's and the architect's plans and specifications.

.5 The specifications do not necessarily mention all the materials and equipment shown on the plans, and vice versa. However, it is understood that the contractor undertakes to supply and install all these materials, just as if they were mentioned on both the specifications and the plans.

.6 In cases where two descriptions of equipment, materials or systems do not match, either on the plans or in the specifications, the contractor is required to include in his bid the more demanding of the two descriptions.

.7 It should be noted that plans and specifications remain the property of the engineer and are to be used only for the purposes for which they were prepared.

1.4 INSURANCE

.1 The contractor shall provide all insurance required by the owner in accordance with the prescriptions of the architect's and/or owner's documents.

1.5 MODIFICATIONS

.1 No modification will be permitted without the contractor obtaining written authorization from the owner or his representatives. A directive or change will then be issued

.2 Any work incorporated into the building not in accordance with the plans and specifications will be undone at the contractor's expense. The owner reserves the right to change the quantity,

quality, type of work or apparatus shown on the plans and mentioned in the specifications without affecting the validity of the contract. Adjustments required by such changes must be agreed to in writing by the owner before proceeding.

1.6 MATERIALS AND LABOUR

.1 The contractor must supply new materials of the capacity and quality specified in the plans and specifications.

.2 No defective or inferior material may be used in the execution of the work covered by this quotation.

.3 The contractor will be required to include in his bid all works and materials required by the good practice of the trade, even if they are not particularly indicated here, but which will contribute to making the construction complete.

1.7 COORDINATION BETWEEN TRADES

.1 Before beginning any installation work, each trade must come to an agreement with the other trades involved in installation work that could affect its work. They must coordinate their installation work, taking into account the work being carried out by other trades, as well as architectural and structural constraints.

.2 Each will advise the others regarding openings, anchors, supports and other provisions required for the installation of the works mentioned and will obtain the required information in time to avoid delaying the execution of the work.

.3 Nothing in the foregoing shall relieve the contractor of his responsibility to carry out, at his own expense, any opening, anchoring, etc., that may subsequently be required.

1.8 LIABILITY

.1 The contractor must have control of the work and must effectively direct and supervise the work to ensure compliance with the contract documents. He is solely responsible for the means of construction, methods, techniques, sequences and procedures, as well as for the coordination of all parts of the work performed under the contract.

.2 The contractor accepts responsibility for the installation of his own work and for any damage caused to the owner or the installations as a result of poor workmanship or installation in the wrong place.

.3 The contractor shall ensure that his work is completed promptly prior to the pouring of concrete or other similar work. If it is necessary to cut or repair finished or unfinished work,

employ, at his own expense, a specialist in the part of the work involved to make the cuts and repairs.

.4 Coordination must take account of architectural ceiling heights and maintain a minimum headroom of 2400 mm in equipment rooms and rooms without ceilings. Please also refer to the article "Location of exits" in this section.

.5 If materials supplied by one trade are to be incorporated into the work of other trades, the contractor will be responsible for coordinating the two trades so that the former supplies the required materials and measurements of the necessary openings to be made, and the other trades incorporate the materials as specified.

.6 If the contractor covers or allows to be covered any part of the work before tests and inspections have been made, completed or given, the contractor shall, upon request, uncover the part in question, cause the inspections and tests to be satisfactorily completed and restore the said part of the work at his own expense.

1.9 WARRANTY

.1 The contractor will have to check all his installations and will be responsible for any defects that may occur within one year of provisional or qualified acceptance of the work by the engineer.

.2 If, for any reason, an appliance or system is not functioning properly, the contractor will be obliged to make the necessary modifications, at no extra charge, to ensure that the appliance or system functions normally, even if this means changing connections, undoing conduits or piping to ensure that there are no blockages, etc.

1.10 SITE SURVEY

.1 Before submitting his tender, the contractor shall examine the site where the work is to be carried out, or the existing buildings (where the contract is to be carried out in existing buildings), and shall study the local conditions affecting the work under this contract. No additional compensation will be granted for the consequences of his negligence in making this examination.

.2 He will carefully study the structural and architectural drawings to ensure that the work under this contract can be satisfactorily performed without changes to the building as shown on the plans, and before commencing work, he will examine the work of other trades and report to the engineer any defects or impediments to the performance of the work described in these specifications or affecting the required warranty.

1.11 CODES AND STANDARDS

.1 Unless otherwise specified, work must be carried out in accordance with the current edition of the National Building Code (NBC), any other applicable provincial or local laws, regulations, standards and codes (latest version in force), and the best practices recognized in the construction industry.

.2 The work must comply with or exceed the requirements of the contract documents and all applicable laws, regulations, standards, codes and rules of art.

.3 In the event of omissions or contradictions between these documents, the most stringent requirements will apply.

1.12 INSPECTION AND PERMITS

.1 To obtain all necessary permits and to pay all fees and charges in order that the above-mentioned works may be carried out. Before proceeding with the execution of the said works, submit for approval and registration, the plans to the offices of the inspectors of pressure vessels, gas, plumbing, environment, etc., or others of the province of Quebec, according to its own specialty and pay all fees required in this regard.

.2 Upon completion of the work, provide the required certificates (attestation de concordance) with copies to the engineer and owner certifying that said work has been performed in accordance with the laws and regulations of the province of Quebec and the requirements of the Code. It is understood that the contractor will pay for any additional copies required by the board of examiners of the specialty concerned.

1.13 DOCUMENTS/SAMPLES/ WORKSHOP DRAWINGS TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit the required documents and samples confor mently with the requirements on Documents and Samples to be submitted.

.2 For glues, paints, coatings, sealants, cleaners, chemicals and other similar products, as well as for any hazardous materials, submit the Material Safety Data Sheets (MSDS) required under the Workplace Hazardous Materials Information System (WHMIS), which must comply with this system and specify the VOC emission rate.

.3 The contractor will arrange for the preparation of such shop drawings as may be required by the contract documents or reasonably requested by the engineer. To this end, he will

prepare a list of such drawings, which will be annotated by the engineer.

.4 These shop drawings must be clearly identified with this project using the titles, terminology and symbols defined in the engineer's plans and specifications.
.1 Identify the items referred to on the documentation supplied by the manufacturer, i.e.: name and number of the specification section concerned.

.5 Drawings must be arranged in such a way as to leave a minimum space of 75 mm x 75 mm for the engineer to affix the examination stamp.

.6 The contractor must submit shop drawings to the engineer for review within a reasonable time and in a logical order (by discipline) so as not to delay the work or the work of other contractors. When submitting shop drawings to the engineer, the contractor must inform him in writing of any discrepancies between the shop drawings and the contract documents.

.7 Shop drawings must be submitted in PDF format, one file per device type, named according to the device name and the nomenclature indicated in the plans and specifications (e.g.: Fans.pdf), but grouped in several shop drawings per shipment.

.8 Shop drawings may not be sent by fax.

.9 Once the drawings have been annotated, the engineer will return the analyzed drawing (in PDF format) to the general contractor, who will make any copies required by the project (subcontractors, owner, professionals).

.10 When the words "manufacturer's start-up" (or any similar words) accompany the specification of any product, this means that start-up must be carried out by an authorized technical representative of the manufacturer and not by the contractor. This should be interpreted as an option and included as such on shop drawings.

.11 Technical data taken from manufacturers' catalogs and documentation must be reliable data, confirmed by tests carried out by the manufacturers themselves or, on their behalf, by independent laboratories, and certifying the conformity of the components with the physical characteristics, performance criteria and requirements of the codes and standards in force.

.12 Shop drawings must be sufficiently complete and detailed to judge the quality and efficiency of the proposed systems.

.13 Shop drawings must show or indicate the following:
.1 manufacturing materials;
.2 construction details for internal and external parts;

.3 assembly details and installation instructions;
.4 accessories;
.5 the necessary clearances to allow operation and maintenance of the equipment.

.14 Submit the required technical data sheets and manufacturer's documentation for each product.
.1 Technical data sheets must indicate product characteristics, performance criteria, dimensions, limits and finish, including a description of appliances and equipment, manufacturer's name, type, model, year of manufacture, power and flow rate.

.15 Submit the following documents with shop drawings and data sheets:
.1 detail drawings of bases, supports/suspensions and anchor bolts;
.2 data on the sound power of systems and equipment, where applicable;
.3 performance curves with indication of operating points.
.4 the installation instructions supplied by the manufacturer.
.5 wiring and circuit diagrams.
.6 a certificate of compliance with relevant standards and codes.

.16 The only purpose of the engineer's review of the shop drawings is to check that the data shown on them conforms to the general concept.
.1 This review does not imply that the engineer approves the detailed design presented in the shop drawings, which is the responsibility of the Contractor submitting them, nor does it relieve the Contractor of the obligation to submit complete and accurate shop drawings, and to comply with all requirements of the work and contract documents.
.2 Without limiting the generality of the foregoing, it is important to specify that the Contractor is responsible for the accuracy of dimensions confirmed on site, for providing information concerning shaping methods or construction and installation techniques, and for coordinating the work performed by all trades.

1.14 ACCEPTABLE PRODUCTS

.1 Subject to further clarification in this clause, "acceptable marks" are those trademarks shown on the plans and specifications, whether alone or accompanied by a model or catalog number.

.2 The "specified product" is the trademark accompanied by at least one manufacturer's model and/or product number, as identified in the specific product description.

.3 Named marks" are those trademarks named after the product(s) specified in the plans and specifications and are

not accompanied by a manufacturer's model or product number. These named marks are considered to represent the quality, style and type of products required. However, since the design is based on the specified products, it is the contractor's responsibility to demonstrate the equivalence of the product model for which the mark has been named, in accordance with the following article.

.4 No proposal to substitute any specified piece of equipment or material will be considered in the selection of the bidder. The bidder will be selected on the assumption that his bid is based on the products specified in the plans and specifications.

.5 Subject to the following article, no substitutes of brands other than those indicated on the plans and specifications may be submitted as equivalent at the time of approval of shop drawings, as these substitutes do not correspond to the above definition of "Acceptable Products".

.6 In the case where there is only one brand of product indicated with the words "or approved equivalent", this brand then becomes the specified brand for the product (whether or not it is accompanied by any model) and other equivalent brands may be submitted for approval as long as they meet the requirements of the specified brand and a credit is presented to the owner (see next clause).

1.15 PRODUCTS AND METHODS ACCOUNTED FOR BY THE EQUITY METHOD

.1 A request for equivalence submitted to the engineer by the contractor will be considered only if a credit is presented to the owner.

.2 Requests for product equivalence should be submitted at the same time as shop drawings, while requests for method equivalence should be submitted as soon as possible. In all cases, the contractor must take into account in the work schedule that a delay of several days may be required for the analysis of the equivalence request. No delay will be accepted for such a request.

.3 When such a request is made, it is the contractor's responsibility to provide proof of equivalence in the form of a table comparing the characteristics of the specified method or product and the contractor's suggestion presented as equivalent.

.4 The study will be presented in writing and will take into account, among other things, the following criteria: credit presented, purchasing policy specified in the quotation, functionality, construction, performance, efficiency, capacity, performance, dimensions, weight, footprint, minimum standards, availability of spare parts, maintenance problems,

delivery times, existence of similar, proven equipment in service.

.5 The engineer will submit to the customer and the contractor the engineering fees involved in these changes, and these fees must be included in the contractor's proposed credit.

.6 Following verification of the proof of equivalence, the engineer will make the required recommendations to the owner, and no order or installation of material or equipment will be placed or carried out until authorization has been obtained.

.7 If a piece of equipment or materials other than those specified in the plans and specifications are accepted, the contractor will be responsible for and must, at his own expense, pay for the cost of modifications and additions of additional equipment or materials for all trades, so that each trade performs the same functions as with the specified equipment and/or materials.

.8 Following rejection of his first equivalent proposal, the contractor shall resubmit shop drawings of the specified products or manufacturing drawings of the specified method as described in the plans and specifications without any equivalence. He shall bear the cost of any delays in the work caused by these additional verifications.

1.16 DOCUMENTS/ ITEMS TO BE HANDED IN ON COMPLETION OF WORK

.1 Provide the required operation and maintenance sheets and incorporate them into the manual prescribed in the section on documents/items to be handed in on completion of work.

.2 Provide the owner with manufacturers' instruction booklets for each device requiring maintenance in PDF format.

.3 These manuals will be presented in the form of ring binders. Each booklet will be divided into sections by a separator sheet, with colored indicators bearing the necessary identification. A table of contents will be inserted at the beginning of the booklet, with the title of each section identified.

.4 These booklets must be handed over on provisional acceptance of the project, or at the engineer's request.

.5 All booklets must be written in French.

.6 Operation and maintenance manuals (electronic and hard copy) must be designed specifically for the prescribed system and contain information relevant to the project only.

.7 These instructions will contain all graphs, curves, capacities and other data supplied by the manufacturers concerning the operation and details of any mechanical equipment used.

.8 Fan graphics should clearly indicate the specified operating points and the required HP power. They should also show the serial number, fan model and speed.

.9 The pump graphics should show the maximum discharge coefficient, the required H.P. power and the calculated operating point. The graphs will also show the pump's serial number, model, number and diameter of impellers, number of bearings and speed.

.10 Technical data from catalogs and manufacturer's documentation, including model number, type and dimensions, for each component.

.11 Operation sheets must include the following:
.1 control/regulation circuit diagrams for each system, including the room control/regulation circuit;
.2 a description of each system and its control/regulation devices;
.3 a description of how each system operates under various loads, with a schedule of setpoint changes and indication of seasonal deviations;
.4 operating instructions for each system and component;
.5 a description of the measures to be taken in the event of equipment failure;
.6 a table of fittings and a flow diagram;
.7 the color code.

.12 Maintenance sheets should include the following:
.1 instructions for maintenance, repair, operation and troubleshooting of each component;
.2 a maintenance schedule specifying the frequency and duration of tasks, as well as the tools required to perform them;
.3 a list of special tools required for adjustment, repair and replacement of parts;
.4 a list of recommended spare parts;
.5 names and addresses of spare parts suppliers.

.13 Performance sheets must include the following:
.1 performance data supplied by the equipment manufacturer, specifying the operating point of each piece of equipment, measured once commissioning is complete;
.2 results of equipment performance tests;
.3 any other specific performance data specified elsewhere in the contractual documents;
.4 TAB (test, adjustment and balancing) reports, in accordance with the requirements of section 23 05 93 - Testing, adjustment and balancing of HVAC systems.

.14 Test and commissioning reports :

.1 As specified in the commissioning sections (MS).
.2 Provide preliminary piping test reports.
.3 Provide one (1) copy of the schematic diagram of each network and the valve nomenclature.

.15 Approval
.1 For approval, submit one (1) PDF copy of the draft Operations and Maintenance Manual to the Consultant. Unless otherwise directed by the Consultant, sheets should not be submitted individually.
.2 If necessary, make the required changes to the operation and maintenance manual and resubmit it to the Consultant.

.16 Additional information
.1 Prepare additional information sheets and append them to the O&M manual if, during the above-mentioned training sessions, it becomes clear that such sheets are needed.

1.17 AFTER CONSTRUCTION" PLANS

.1 Documents to be kept on site
.1 The Consultant will provide one (1) set of reproducible mechanical drawings in PDF format.
.2 Provide the number of copy sets required for each phase of the work, and indicate any changes made during the course of the work.
.3 Record during the course of the work, on a copy of the white-background plans, all modifications or deviations of piping runs, conduits, etc., and any changes in equipment installation, as originally shown on the plans, in order to constitute a complete record of the work as performed. These plans will be handed over to the engineer on completion of the work.
.4 The exact location of underground or concealed conduits or pipes should be indicated using measurements taken from reference points. On this copy of the plans, please also indicate the location of all access doors to taps, controls, cleaning manholes, etc.
.5 Transfer the information noted on the copies to the reproducible drawings on a weekly basis, so that the latter show the mechanical systems and devices as they are actually installed.
.6 Use a red indelible ink pen, then a different color for each other network.
.7 Keep these drawings on site and make them available for reference and verification.

.2 As-built drawings for each system.
.1 Once the work has been completed, but before final acceptance, submit a complete set of as-built drawings for each system.
.2 Before carrying out tests and commissioning, particularly for TAB operations (testing, adjusting and balancing HVAC systems), complete the as-built drawings.

.3 Identify each drawing in the bottom right-hand corner, in letters at least 12 mm high, as follows: "AS-BUILT DRAWING: THIS DRAWING HAS BEEN REVIEWED AND SHOWS THE MECHANICAL SYSTEMS/DEVICES AS THEY ARE ACTUALLY INSTALLED". (Contractor's signature) (Date).
.4 Submit drawings to the Consultant for approval, then make any necessary corrections as directed.
.5 Carry out tests and start-ups, including testing, adjusting and balancing HVAC systems, with as-built drawings.
.6 Submit reproducible copies of completed as-built drawings, along with the operation and maintenance manual.

1.18 LIST OF WORK TO BE COMPLETED AND NON-CONFORMING WORK

.1 The engineer will carry out a summary verification of the work when requested by the owner. The contractor must inform the engineer of the timing of these checks prior to concealing the work (closing walls, ceilings, etc.). The engineer will then issue a list of non-conforming work to be completed.

.2 The engineer reserves the right to take samples of products for analysis and testing.

.3 Following corrective action by the contractor and written confirmation that the corrective action has been taken, the engineer will carry out a verification of the corrective action. Should it turn out that certain corrections are still necessary, any additional verification required of the engineer for this work will be billed to the contractor on an hourly basis, through the owner.

.4 Despite the engineer's summary checks, the contractor remains fully responsible for complying with the plans and specifications.

1.19 WORK ON EXISTING SYSTEMS

.1 Prior to any demolition work, consult the plans so that you can take the required flow and/or pressure readings, in accordance with the requirements of section 23 05 93 - Testing, adjusting and balancing HVAC systems.

.2 Work on existing systems will include removing them in whole or in part, modifying them, relocating existing devices, restoring them to good working order, and reconnecting them in whole or in part to the new systems, all at the expense of the sections concerned, so as to carry out the new work shown in the plans and specifications, in accordance with the rules of the trade and the laws and regulations in force.

.3 Specific plans and specifications for existing systems will not be provided, so when visiting the site, carefully study and

familiarize yourself with these systems, as no extra charge will be made for work on existing systems.

.4 All systems to be removed or modified in this way must be done in such a way as not to interfere with the proper functioning of certain parts of the existing building, which will continue to be used during the work according to the owner's needs.

.5 Come to an agreement with the owner on the time periods during which modifications and connection of new systems to existing systems can be carried out.

.6 The contractor must consider that some work will inevitably have to be carried out at his own expense outside normal working days and hours.

.7 All temporary work required to permit the new work described in the plans and specifications shall be included in the total bid cost of the sections concerned, even if not described or shown in the plans and specifications.

.8 The section concerned must also relocate, at its own expense, all existing materials and equipment of the various systems within its specialty, which obstruct the passage for the execution of its work and that of all other trades. All elements used for the extension due to the relocation of existing materials or equipment must be identical to those already in place.

.9 Carry out work in the existing building in a clean and careful manner, to avoid damaging walls, ceilings and floors.

.10 All materials from existing systems to be removed for the new work shown on the plans must be removed by and at the expense of the section concerned, unless otherwise indicated on the plans. The contractor shall verify whether the owner wishes to retain any materials or equipment that have been removed; otherwise, any materials not reused shall become the property of the section concerned, which shall dispose of them off-site in accordance with current environmental standards.

.11 When a new connection has to be made to an existing duct or pipe, the lagging has to be redone in accordance with the existing system and the terms of the estimate.

.12 When work is to be carried out on an existing pipe in the ground, take the necessary steps (specialist services with detection equipment) to pinpoint the exact location of the existing pipe.

.13 Consult the architect's documents and consider the chronological order of the work when preparing the bid.

.14 Organize the work so as not to unnecessarily obstruct the building's various access routes.

1.20 DRILLINGS, OPENINGS, SLEEVES AND FIREPROOF PROTECTIONS

.1 In both new and existing buildings:
.1 Drilling and openings larger than 152 mm in diameter are the responsibility of the general contractor.
.2 Drillings or openings of 152 mm or less will be the responsibility of the section requiring the drilling or opening for the passage of pipes or ducts.

.2 Sleeves and holes should have an inside diameter that takes into account the type of pipe, the thickness of the insulation and the type of fireproofing system used. If no fire resistance is required, the opening must be 25 mm larger than the duct, tube or piping, including its thermal insulation.

.3 Unless otherwise indicated on the plans or in the installation details of the fire protection, wherever pipes pass through walls, floors, ceilings and roofs, the section responsible for the through element (conduit, pipe, tube, wiring or other) and its installation must supply and install minimum schedule 10 steel pipe sleeves before the concrete is poured to allow the passage of these elements.

.4 All free space around through elements will be plugged by the relevant section as described below.
.1 In foundation walls, voids are filled using modular devices such as "Link-Seal" model LS complete with model CS sleeve.
.2 In walls or floors for which a fire-resistance rating is required, the passage of elements must be carried out using appropriate fire-stop protection, in accordance with the regulations.
.3 In other partitions, caulk the voids between the opening or sleeve and the pipe, using fiberglass wool and a waterproof, flame-retardant, non-hardening mastic installed on both sides.

.5 The contractor must request technical bulletins from the supplier of the fireproofing materials to be used, including installation details in compliance with ULC approval and the "Service Penetration Assemblies" or "SP" identification number corresponding to the assembly to be carried out on site.

1.21 LOCATION OF EQUIPMENT AND OUTLETS

.1 The location of fixtures, equipment and outlets shown on the plans should be considered approximate. The exact location must be coordinated with the architect's and structural plans.

.2 Install equipment and piping in such a way as to minimize clutter and conserve as much floor space as possible, in accordance with the manufacturer's recommendations on safety, access and maintenance.

.3 Unless otherwise specified on the plans, the height of equipment and piping must take account of architectural ceiling heights, and maintain a headroom of 2400 mm in equipment rooms or rooms without ceilings. All necessary deviations must be provided for by the trades. If, after coordination between the various trades and after allowing for all possible deviations, certain heights cannot be respected, notify the engineer in writing, who will issue a written instruction to this effect.

.4 Ensure that maintenance and dismantling can be carried out with minimum displacement of pipe and duct junctions, using union fittings and flanges, and without obstruction from building structures or other installations.

.5 Only the dimensions given on the plans will take precedence when installing mechanical work.

.6 The specifications do not necessarily mention all the materials and equipment shown on the plans, and vice versa. However, it is understood that the contractor undertakes to supply and install all these materials, just as if they were mentioned on both the specifications and the plans.

.7 All mechanical equipment and outlets (grilles and diffusers, fire extinguisher heads, convectors, coils, etc.) can be relocated within a three-meter radius before installation, without credit or extra charge.

1.22 DEVICE SUPPORTS AND STRUCTURES

.1 Supply and install all metal supports and framing required to support the devices, pipes, ducts and sheaths specified in each section, in accordance with the specifications.

.2 Unless otherwise specified, these supports must be made of galvanized steel to prevent corrosion, and built in accordance with good engineering practice and provincial codes. This work will be carried out by qualified welders and labourers.

1.23 QUALITY ASSURANCE

.1 Quality assurance: in accordance with the relevant sections of the architectural documents and the owner's requirements.

.2 Pre-installation meeting

.1 Before starting work, hold a meeting in accordance with the relevant sections of the architectural documents and

the owner's requirements, at which the following will be carried out.

.1 We'll check the job requirements.

.2 The condition of the installation will be examined.

.3 Work will be coordinated with that of other trades.

.4 Review the manufacturer's installation instructions and the terms of the manufacturer's warranty.

1.24 HEALTH & SAFETY

.1 It is the contractor's responsibility to ensure the safety of his site.

.2 Take the necessary construction health and safety measures in accordance with the relevant sections of the architectural documents and the owner's requirements.

.3 Obtain all CNESST permits and approvals for temporary scaffolding or any other installation required for work at height, as well as any installation involving increased risks (e.g. confined spaces).

1.25 TRANSPORT, STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with general product requirements.

.2 Transport, store and handle equipment and materials in accordance with the manufacturer's written instructions.

.3 Deliver materials to the job site in their original packaging, which must be labelled with the manufacturer's name and address.

.4 Store materials and equipment in a clean, dry, well-ventilated area.

.5 Protect materials and equipment from weather and damage.

.6 Replace defective or damaged materials and equipment with new ones.

1.26 WASTE MANAGEMENT AND DISPOSAL

.1 Management and disposal of construction/demolition waste: sort waste for reuse and recycling, including taking back pallets, crates, padding and other packaging materials from their manufacturers, in accordance with the relevant sections of the architectural documents and the owner's requirements.

.2 Remove all waste materials from the site and transport them to appropriate facilities, giving priority to recycling and reclamation.

.3 Place substances that meet the definition of toxic or hazardous waste in designated containers.

.4 Handle and dispose of hazardous materials in accordance with the Canadian Environmental Protection Act, the Transportation of Dangerous Goods Act, and provincial and municipal legislation.

.5 It is forbidden to pour paint products, coatings, sealants, adhesives or any other product into sewers, waterways, lakes, on the ground or in any other place where it could present a health or environmental hazard.

1.27 CHANGE NOTICE PRICES

.1 When the contractor submits a price for a notice of change, it will be broken down to the engineer's satisfaction, including the broken-down bids received from all subcontractors as an appendix to his proposal. It will then be analyzed by the engineer and negotiated if necessary. As a minimum, the price must meet the requirements of the contract clauses.

.2 Hourly rate :
.1 Unless otherwise indicated in the architectural documents or in the administrative clauses, the hourly labor rate will be in accordance with the current collective agreement decreed by the Association de la Construction du Québec, as shown in column 17 of the most recent rate table, before profit and administration.
.2 Hourly rates suggested by associations such as CETAF, ASPE, CMMTQ or CMEQ will not be accepted.

.3 Profit and administration: unless otherwise specified in the architectural documents or administrative clauses, the trade's profit and administration will be 15% on its own work and 10% on the work of its subcontractor.

.4 In the event that no agreement can be reached, the engineer will submit to the owner the price he deems acceptable. No costs for foreman time, estimating or drawing will be considered as part of administration and profit.

.5 If the owner deems it appropriate, a work order will then be issued and the contractor will be required to carry out the work provided for in the notice of change without delay for the price set by the engineer.

.6 The contractor shall be at liberty to exercise his rights of claim in accordance with the procedures provided for in the contract.

1.28 QUESTIONS

.1 All questions relevant to the engineering work must be submitted to the engineer in writing, within a reasonable time to allow the engineer to respond. Consequently, no delay in work due to delay in response will be accepted.
.1 All ducts, fittings and openings of all HVAC units must be sealed at the factory with a plastic or removable plug until final connection, to prevent the introduction of dust or debris into the system and the building.
.2 All adhesives, sealants and sealants used must have a VOC content that complies with the Green Seal GS-36 standard and SCAQMD regulation 1168.
.3 All coatings and paints used must have a VOC content that complies with Green Seal standards GS-11 and GC-03, as well as SCAQMD regulation 1113.
.4 All equipment must be commissioned in accordance with the commissioning plan. A commissioning report must be completed for each piece of equipment on the forms provided by the engineer.

.2 This project has been designed with sustainable development in mind. The contractor must therefore comply with the requirements of the sustainable development sections, which include the following.
.1 Materials, equipment, products and resources.
.2 Collection and storage of recyclable materials.
.3 Construction waste management.
.4 Reuse of resources.
.5 Recycled content.
.6 Local/regional materials and equipment.
.7 Certified wood products.
.8 Low-emission materials and equipment.
.9 Quality control.

PARTIE 2 - PRODUCTS

2.1 MATERIALS - GENERALITIES

.1 Product requirements must be followed in accordance with the relevant sections of the architectural documents and the owner's requirements.

.2 All inscriptions on the units must be in French.

2.2 ACCESS DOORS

.1 Provide access doors in furred ceilings or partitions to allow access to equipment and accessories, or inspection of installations or control devices.

.2 Access doors must be supplied by the section responsible for the equipment to be made accessible, and installed by the section responsible for wall or ceiling construction.

.3 Unless otherwise specified, access doors in gypsum partition walls will be CENDREX model AHA-GYP, size 300 x 300 mm for hand entry and 600 x 600 mm for access.

.4 Provide stainless steel access doors for ceramic, marble and terrazzo surfaces.

.5 Access hatches installed in walls and ceilings will have the same fire resistance as the wall or ceiling in which they are installed.

2.3 FLANGES AND PLATES

.1 Install facing strips where pipes pass through finished walls, partitions, floors and ceilings.

.2 On walls and ceilings, install chrome-plated or nickel-plated split brass collars fitted with locking screws.

.3 The inside diameter must match the outside diameter of the insulated pipe. The outside diameter must be greater than that of the opening or sleeve.

.4 If the sleeve extends beyond the finished floor, the collars or plates must surround the sleeve extension.

.5 Fix them to the pipe or finished surface, but not to the lagging.

PARTIE 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of conditions: before installing materials and equipment, ensure that the condition of surfaces/substrates previously installed under other sections or contracts is acceptable and allows work to be carried out in accordance with the manufacturer's written instructions.

.2 Inform the Consultant immediately of any unacceptable condition detected.

.3 Start installation work only after unacceptable conditions have been corrected.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with the manufacturer's requirements, recommendations and written specifications, including any available technical bulletins, product handling, storage and installation instructions, and data sheet indications.

.2 Notify the engineer in writing of any discrepancies between these specifications and the manufacturer's installation and testing instructions; the engineer will then determine which document to use.

3.3 PAINTING WORK

.1 All steelwork will be carefully cleaned and degreased, and left in condition for painting.

.2 Apply at least one coat of corrosion-resistant primer to appliance supports and ferrous metal parts.

.3 Do not paint nameplates.

3.4 TOUCHING UP AND RESTORING PAINT COATINGS

.1 Prime and touch-up surfaces with damaged paint finish, and ensure that the new finish matches the original.

.2 Do not paint nameplates.

3.5 START-UPS

.1 General
- .1 As specified in the commissioning sections (MS).
- .2 According to manufacturer's recommendations.

.2 Obtain the engineer's written permission to start up and test permanent plant and equipment, prior to acceptance.

.3 All equipment and systems must be started up, adjusted and calibrated to give the capacity and performance specified in the plans and specifications.

.4 When requested, for certain equipment, obtain and pay for the services of an engineer seconded from the manufacturer's plant to supervise the start-up of the installations and to check, adjust, balance and calibrate the various system components.

.5 Then, in the presence of the engineer, perform all tests on the running machinery and installed equipment to demonstrate that they will meet the capacity and performance guarantees set out in the plans and specifications.

.6 Heating, ventilation and air-conditioning systems must not be used continuously for temporary heating of the building or prior to provisional acceptance.

3.6 ON-SITE QUALITY CONTROL

.1 On-site tests :

.1 Carry out tests in accordance with the Quality Control section and submit reports in accordance with the requirements set out in the DOCUMENTS/SAMPLES TO BE SUBMITTED section of PART 1.
.2 Perform tests in accordance with commissioning sections (MS).
.3 Notify the Consultant, at least 24 hours in advance, of the date and time of the tests, so that he may attend.

.2 Do not lag or conceal the work until it has been tested and approved by the Consultant. Follow the work schedule and make the necessary arrangements for the test.

.3 Assume all costs, including retesting and refurbishment.

.4 Identification :
.1 Among other things, ensure that all devices are correctly labeled and identified.

.5 Manufacturer's on-site inspections (when required)
.1 The manufacturer must make recommendations on the use of the product(s), and carry out periodic visits to check that the installation has been carried out in accordance with his recommendations.
.2 Arrange with the manufacturer's representative to inspect the work in the section requiring it, and submit written reports confirming that the work complies with the requirements of the contract documents.
.3 Notify the Consultant, at least 24 hours in advance, of the date and time of the tests, so that he may attend.
.4 On-site inspections by the manufacturer :
.1 once the products have been delivered and stored on site;
.2 once preparatory and other preliminary work has been completed, but before installation work begins;
.3 as the work progresses, at the appropriate times depending on the equipment and the manufacturer's recommendations;
.4 once the work is completed.
.5 Submit the manufacturer's reports to the Consultant within three (3) days of the manufacturer's representative visiting the site.
.6 Obtain a written report from the manufacturer confirming compliance of the work with specified criteria for handling, installation, application of products and protection and cleaning of the work, and submit this report in accordance with PART 1, DOCUMENTS/SAMPLES TO BE SUBMITTED.
.7 If necessary, make corrections and adjustments based on the manufacturer's written report.

3.7 DEMONSTRATIO N

.1 The Consultant will use certain equipment, materials and systems for testing purposes, even before they have been

accepted. Provide all labor, materials and instrumentation required to perform the tests.

3.8 TRAINING

.1 Provide tools, materials and qualified instructors to train operations and maintenance personnel during normal working hours in the operation, control/regulation, adjustment, troubleshooting and maintenance of equipment and systems prior to acceptance.

.2 Training courses must also comply with the requirements of the commissioning sections (MS).

.3 The training material must include, among other things, the operation and maintenance manual, as-built drawings and audio-visual aids.

.4 Establish a schedule of training sessions and have staff sign up for them. Obtain list of designated personnel from owner.

.5 At the end of the training period, give one copy of the manual to the farm manager, and the rest of the manuals to the owner.

3.9 PROTECTION

.1 Protect installed equipment and components from damage during construction.

.2 Repair damage to adjacent land, materials and equipment during installation of materials and equipment, to the satisfaction of the architect and engineer.

.3 Use appropriate elements to prevent dust, dirt and other foreign matter from entering openings in devices, equipment and systems.

3.10 CLEANING

.1 Carry out cleaning work in accordance with the relevant sections of the architectural documents and the owner's requirements.

.2 Leave the premises clean at the end of each working day.

.3 Wipe the equipment clean of dirt, dust, oil and paint.

.4 Maintain equipment in a clean condition until final acceptance.

.5 Clean the inside and outside of all components, devices and systems, including strainers and filters, and vacuum the inside of air ducts and air handling units.

.6 Once installation work and performance testing have been completed, remove surplus materials, waste, tools and equipment from the site.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL

.1 All articles of section 21 05 01 must be respected by this section.

.2 The work in this section includes materials, equipment, labor, workmanship, tools, scaffolding, management and all that is necessary and required for the supply, installation and complete start-up of the heating/cooling systems and related work described below and as shown on the plans and/or described in these specifications.

.3 All work must be carried out in accordance with the spirit of the plans and specifications in all their details and chapters, as well as the main applicable codes and standards.
- .1 CNB
- .2 CAN/CSA B214
- .3 CAN/CSA B317
- .4 Pressure Vessel Act and Regulations
- .5 NQ 3650-900
- .6 CAN/CSA B52
- .7 CAN-CSA B51
- .8 ASHRAE
- .9 Regulation concerning stationary enginemen

1.2 SKILLS

.1 The manufacturer of the equipment specified must have a local representative; he must also have experience in the manufacture of the monobloc units specified in these specifications, supply complete catalogs of his products and assume full responsibility for the selection, operating characteristics, quality and assembly of the monobloc units. The manufacturer's representative must also provide on-site after-sales service.

1.3 TEMPORARY HEATING

.1 Temporary heating is part of the architect's plans and specifications and will be provided by another division. None of the equipment specified in these plans and specifications is to be used for temporary heating.

1.4 CONTROL

.1 General

.1 All controls will be supplied and connected by Division 25 unless otherwise indicated in the plans and/or specifications.

.2 Certain accessories, such as control valves and bulb wells, will be supplied by Division 25, but installation will be carried out by this section.

.3 The contractor of this section will adjust and start up the heating systems, in cooperation with Division 25.

1.5 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Supply documents and samples in accordance with general specifications.

1.6 QUALITY ASSURANCE

.1 Workforce qualification

.1 The installer must be an expert in the field, have at least three years' proven experience in carrying out work of the type and scope described herein, and possess the required qualifications.

1.7 TRANSPORT, STORAGE AND HANDLING

.1 Storage and protection

.1 Protect materials and equipment from the elements and from damage caused by the movement of people, equipment and vehicles.

.2 Protect materials and equipment from damage.

.2 Store materials and equipment at temperatures and under conditions specified by the manufacturer.

1.8 TYPE OF WORK

.1 The work in this section includes, among others:

.1 Modify and extend the building's existing natural gas network, including relocation of an existing unit heater.

.2 Supply and install all new unit heaters shown on the plan.

.3 Supply and install flues and chimneys for equipment such as boilers, water heaters and generator exhausts.

.4 Drill all holes and install all sleeves required for the work in this section.

.5 Carry out seismic protection work applicable to heating-cooling systems.

.6 Install the valves and control elements supplied by the control section.

.7 Perform the identification work applicable to section 23 05 00.01 and described in section 23 05 53.01.

.2 Refer to the table of contents for a list of sections applicable to heating-cooling.

1.9 PLANT CLASSIFICATION AND MONITORING OF STATIONARY MACHINES

.1 The installations are class 4 "Heating and steam engines" and class B "Refrigerating appliances" according to the regulations for stationary engineers.
.2 The type of monitoring required by current regulations will be periodic.

PART 2 - PRODUCTS

2.1 NOT APPLICABLE

.1 Not applicable

PART 3 - EXECUTION

3.1 DESCRIPTION OF DISMANTLING WORK

.1 Refer to the plans for modifications to the existing natural gas network.

END OF SECTION

PART 1 - GENERAL

1.1 WORK DESCRIPTION

.1 All articles of section 21 05 01 must be respected by this section.

.2 The work includes, but is not necessarily limited to:
.1 Complete dismantling of the existing dust extraction system, including equipment, ductwork, supports, accessories and insulation.
.2 Supply and install all types of ventilation systems;
.3 Supply and install all sheet metal covers for conveyors and collection hoods.
.4 Supply and install all required brackets and hangers.
.5 Supply and install seismic protection systems for ventilation and air conditioning systems.
.6 Supply and install the identification of networks and devices applicable to ventilation/air conditioning.
.7 Supply and install thermal insulation for ventilation and air conditioning systems.
.8 Provide integration drawings for all mechanical elements.
.9 Supply and install any balancing registers required for TAB operations, whether or not they are shown on the plans.

.3 Refer to the table of contents for a list of sections applicable to ventilation/air conditioning.

.4 Carry out any additional work required for the installation and start-up of HVAC systems.

.5 Sections 23 05 93 (Balancing) and 25 01 00 (Control) are the responsibility of the general contractor.

.6 Coordinate and collaborate with responsible contractors :
.1 regulation and control systems, division 25.
.2 test, adjustment and balancing (TAB), section 23 05 93.

1.2 QUALITY ASSURANCE

.1 Qualification
.1 The installer must be an expert in the field, have at least three (3) years of proven experience in carrying out work of the type and scope described herein, and possess the required qualifications.

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit documents and samples in accordance with general requirements.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Materials and installation will comply with NFPA 90A and NFPA 90B.

.2 Ceiling types and equipment dimensions
.1 Before purchasing any equipment, check the module dimensions of new and/or existing suspended ceilings, so that equipment such as grilles, diffusers, etc., can be perfectly integrated.

PART 3 - EXECUTION

3.1 WORK DESCRIPTION

.1 Carry out the demolition work indicated on the plans.

.2 Also install equipment supplied by others, as shown on the plans.

3.2 SEALING MEMBRANE

.1 Install sealing membranes on all ventilation and air-conditioning ducts and accessories before sending them to the job site.

.2 The sealing membranes will only be removed one at a time during installation of each duct section.

.3 During duct installation, the seal at each end of the duct will be left in place by the contractor until the next joint is made.

3.3 START-UP AND TESTING

.1 Perform start-up and test(s) in accordance with specifications.

.2 The manufacturer must carry out inspections or tests on the following items:
.1 Fan(s), sections 23 34 00.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA)/CSA International
.1 CSA B51, Boiler, Pressure Vessel and Pressure Piping Code.
.2 CSA B52, Mechanical Refrigeration Code.
.3 CSA B214, Installation Code for hydronic heating system.

.2 Bureau de normalisation du Québec (BNQ)
.1 NQ 3650-900, Installation code for pressure vessels.

.3 National Fire Code of Canada (NFC).

PART 2 - PRODUCTS

2.1 MATERIALS/MATERIALS

.1 Paint: rich in zinc.

.2 Fire protection: as per section on fire protection.

2.2 DRAIN/DRAIN VALVES

.1 Ball type, nominal diameter DN 3/4 unless otherwise specified, with threaded end for hose, plug and chain.

.2 Acceptable products: Dahl, Fig. 50430 or approved equivalent.

2.3 DIELECTRIC CONNECTORS

.1 Dielectric fittings with nominal diameters equal to or less than DN 2 :
.1 Unions, or fittings lined with a thermoplastic inner lining.
.2 Acceptable products: Victaulic 47-TT or approved equivalents.

.2 Dielectric connections with nominal diameters greater than DN 2 :
.1 Teflon-lined flanges.

2.4 ROSACES

.1 Manufactured from one-piece rosettes, held in place by locking screws.
.1 Material: chrome- or nickel-plated brass or stainless steel grade 302.

.2 Dimensions: outside diameter greater than that of the through-hole or sleeve.

.3 Internal diameter appropriate to the external diameter of the pipes on which they are mounted, or of the pipe insulation.

PART 3 - EXECUTION

3.1 GENERAL

.1 Install in accordance with general specifications.

3.2 PIPE INSTALLATION

.1 Apply Teflon tape or jointing compound to the threads of screw-in fittings.

.2 Prevent foreign matter from entering unconnected openings.

.3 Install piping in such a way as to be able to isolate the various devices, enabling them to be dismantled or removed, if necessary, without interrupting the operation of other network components.

.4 Assemble pipes using fittings manufactured in accordance with the relevant ANSI standards.

.5 Install piping, appliances and similar items parallel or perpendicular to the building lines.

.6 Install concealed piping to maximize headroom and available space.

.7 Except where indicated, water or glycol piping should be installed with an upward slope in the direction of flow of the fluid being conveyed, to allow free drainage of the fluid and free ventilation of the system.
.1 Master pipe: slope 1 : 700
.2 Spur: slope 1:100

.8 Except where indicated, install piping in such a way as to allow each pipe to be lagged.

.9 Group pipes together where possible and as indicated.

.10 Cut pipes square, trim ends and remove accumulated slag and foreign matter before assembly.

.11 Clean the inside of the fittings and join the components without jamming them.

.12 Connection saddles can be used on main pipes if the diameter of the branch pipe connected is no more than half the diameter of the main pipe.

.13 Use eccentric reducers at diameter changes to ensure free flow of the conveyed fluid and free ventilation of the network.

.14 Provide means to compensate for thermal movement of piping.

.15 Secure water supply pipes to walls.

.16 Where the drawings show outlets for possible connection of other sanitary appliances, plug the outlets with gas- and watertight plugs or caps.

.17 Faucets
.1 Remove internal parts before welding.
.2 Unless otherwise specified, install fittings so that their operating spindle is above the horizontal line.
.3 Install fittings in such a way that they are accessible for maintenance without the need to dismantle adjacent piping.
.4 Install globe valves on bypasses bypassing control valves.
.5 Unless otherwise specified, install shut-off valves at branch line connections to isolate certain parts of the system.
.6 Install butterfly valves between butt-weld flanges to ensure perfect compression of the sleeve.
.7 Equip valves with a nominal diameter equal to or greater than DN 2 1/2 with a chain operating device when they are mounted more than 2400 mm above the floor or a platform in a mechanical installation room.

.18 Check valves
.1 Install silent check valves on the discharge side of pumps and at other indicated locations.

3.3 CONNECTING PIPING TO APPLIANCES

.1 Use fittings with union or flange connections to isolate the devices from the piping network and to facilitate maintenance and assembly/disassembly.

.2 Use double-jointed fittings when units are mounted on anti-vibration mounts and when piping is likely to move.

.3 Unless otherwise specified, connect piping to appliances and other equipment in accordance with the manufacturer's written instructions.

3.4 DEGRADATIONS

.1 Clearance must be provided around devices to facilitate inspection, maintenance and observation of proper operation, in accordance with the manufacturer's recommendations and the requirements of applicable codes and standards.

.2 There must also be sufficient working space, in accordance with the manufacturer's recommendations, to dismantle and remove devices or parts of equipment, if necessary, without interrupting the operation of other devices or network components.

3.5 EVACUATION/DRAIN TAPS

.1 Install drain valves at low points in the system, at appliances and at isolation valves

.2 Connect a pipe to each drain/emptying tap and run it over a floor drain.
.1 The discharge point must be clearly visible.

3.6 AIR CLEANERS

.1 Install automatic air vents at high points in the hydronic network and in piping systems.

.2 Install isolation valves at each automatic air vent.

.3 Connect discharge lines to approved locations and ensure that the discharge point is clearly visible. When a trap is used on a glycol system, pipe the vent to the nearest recovery or mixing tank.

3.7 DIELECTRIC CONNECTORS

.1 Use dielectric fittings to join dissimilar metal components.

.2 Use dielectric fittings appropriate for the type of piping and the pressure rating of the system.

3.8 ROSACES

.1 Install rosettes where pipes pass through walls, partitions, floors and ceilings in finished areas and rooms.

3.9 IDENTIFICATION

.1 Identify all components in accordance with the section on identifying networks and mechanical devices.

3.10 NETWORK FLUSHING

.1 Carry out cleaning and start-up work on mechanical plant piping networks.

.2 Prior to acceptance of work, clean all equipment and fixtures and restore them to working order, and replace pipe system filters.

3.11 ON-SITE QUALITY CONTROL

.1 Carry out quality control in accordance with general regulations.

.2 Carry out tests in accordance with general specifications.

.3 Pressure testing of equipment and piping :
.1 Notify the Consultant at least 1 week prior to pressure testing. The tests must be carried out in the presence of the Consultant.
.2 Test piping in accordance with the relevant sections on heating, ventilation and air-conditioning systems and installations.
.3 Prior to testing, isolate from the network any equipment or components that are not designed to withstand the intended test pressure or medium.
.4 Pressurize the system and ensure no leakage for at least 4 hours.
.5 Pay the cost of repairing or replacing defective components, re-testing and restoring the system. The Consultant will determine whether to repair or replace the defective components.
.6 Insulate or conceal works only after Consultant's approval of tests.

3.12 EXISTING NETWORKS

.1 Connect the new piping to the existing networks.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)

.2 ASHRAE 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA cosponsored; ANSI approved; Continuous Maintenance Standard).

.3 Electrical Equipment Manufacturers' Association Council (EEMAC)

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).

1.2 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Supply documents and samples in accordance with general specifications.

.2 In the case of equipment fitted with high-efficiency electric motors, the following information on each motor must accompany the equipment's shop drawings:
- .1 make and model;
- .2 serial number;
- .3 power;
- .4 power supply (voltage, phases, frequency);
- .5 type (TEFC, ODP, EXP);
- .6 efficiency;
- .7 revolution (TPM);
- .8 type of building.

Drawings submitted to the engineer for approval that do not include the above information on high-efficiency motors will be returned to the contractor without being reviewed and will have to be resubmitted.

1.3 MAINTENANCE AND SPARE PARTS

.1 Supply replacement/maintenance materials in accordance with general specifications, in addition to the following:
- .1 Provide a spare set of belts for each set installed.

PART 2 - PRODUCTS

2.1 GENERAL

.1 NEMA PREMIUM" high-efficiency motors, in accordance with the requirements of the local electric power distributor and ASHRAE 90.1.

.2 The motors will have the specifications given in the description of each unit (in addition to the specifications in this section). They will be designed for minimum vibration and quiet operation.

.3 The motors will be designed to operate at temperatures between -40 ° C and 40° C and will have a service factor of 1.15. Where necessary, they will be fitted with a sliding base to enable belt tension adjustment.

2.2 MOTORS

.1 Supply the prescribed motors for the devices and mechanical systems concerned.

.2 Motors less than 1/2 HP: unless otherwise specified on drawings or in quotation, single-phase motors, 120 V, speed as indicated, for continuous duty, with built-in overload protection and resilient support.

.3 Motors of 1/2 HP and over: unless otherwise specified, motors shall be of the enclosed/self-ventilated type (TEFC), conforming to the relevant EEMAC standards, three-phase, 600 V, Class B, squirrel-cage induction, ball-bearing, speed 1800 rpm, for continuous duty, temperature rise not exceeding 40 degrees Celsius.

.4 Motors up to 7.5 HP will be fitted with permanently lubricated ball bearings, and motors of 10 HP and over will be fitted with grease-lubricated ball or roller bearings, with grease adapters.

.5 Motors of 30 HP or more will be fitted with thermistors.

.6 The 2-speed motors will be of the 2-winding, variable-torque type.

.7 Motors shall be high-efficiency motors conforming to CSA 390. Motors shall be of the TEFC type, unless otherwise specified.

.8 Ventilated crankcase motors (ODP) will be accepted when TEFC motors are in no way available from the manufacturer for the specified product.

.9 The motor manufacturer is responsible for the choice of motor. The motor horsepower indicated on the plans and specifications should be considered as a minimum. Should the motor size be increased, the manufacturer must advise

the contractor, who will be responsible for changes to the electrical power connection.

.10 Motors used with variable-frequency drives (VFDs) must meet NEMA MG-1 part 31 and Class F insulation requirements, and be of the "INVERTER DUTY" type.

2.3 STARTERS

.1 All starters, remote starting stations, motor control transformers and motor electrical connections are supplied by Division 26, unless otherwise specified.

.2 When starters are supplied by a Division 21, 22 or 23 contractor, or when they are a component part of a one-piece unit, they must be supplied with all accessories and protection as described in Division 26:
- .1 fused isolating switch;
- .2 T.A.A. button;
- .3 control lamps;
- .4 phase loss relay;
- .5 current measuring relay;
- .6 thermistor protection relay.

.3 Minimum rated efficiency must meet the requirements of CSA C390-93.

2.4 TEMPORARY ENGINES

.1 If a delay in delivery of a prescribed motor results in a delay in completion of the work or commissioning of the installation, install a provisional motor approved by the Consultant. Work will be accepted only when the prescribed motor has been installed.

2.5 BELT DRIVE(S)

.1 Reinforced belts must be installed in the drive pulley. Multiple belts should be supplied and fitted in matching sets.

.2 Pulleys must be made of cast iron or steel, and fastened to shafts by means of removable keys, unless otherwise specified.

.3 Motors less than 10 HP: standard drive pulleys with adjustable pitch diameter over a range of plus or minus 10%. Use the intermediate position when setting the prescribed speed.

.4 Motors of 10 HP and over: unless otherwise specified, fixed-diameter pulleys with split taper bush and keyway. Supply appropriately sized pulleys, suitable for the balancing characteristics of the network.

.5 The required pulley dimensions will be determined during commissioning.

.6 Transmission ratings: at least 1.5 times the motor nameplate ratings. Cantilever loads on drive motor shafts must remain within the manufacturer's design limits.

.7 Slide mounting plates must allow for axial adjustment.

.8 Fit reinforced belts on pulleys appropriate to the drive mechanism. All belts on multiple-belt units must have the same characteristics.

.9 For all motors, use a pulley with a split taper bush and keyway, with a fixed pitch; adjustable pulleys can be installed on drives with a single belt. Provide a pulley of the approved size, to ensure balanced rotation.

2.6 GUARDS FOR BELT DRIVE(S)

.1 Provide guards for unprotected transmissions.

.2 Guards for belt drive(s)
.1 Expanded metal mesh, welded to an angle steel frame (minimum 25 mm);
.2 top and bottom in sheet metal at least 1.2 mm thick (18 gauge);
.3 38 mm diameter holes on both shaft axes, for tachometer installation;
.4 removable for maintenance.

.3 It must be possible to lubricate equipment and use test instruments even when the guards are in place.

.4 Belt guards must allow motors to be moved for tension adjustment.

.5 Guards for flexible couplings
.1 U-shaped elements in galvanized mild steel sheet:
.1 2.7 mm thick frame (12 gauge);
.2 Expanded metal mesh, at least 1.6 mm thick (16 gauge);
.2 securely in place;
.3 removable for maintenance.

.6 Guards for unprotected fan inlets and outlets
.1 Galvanized wire mesh or expanded metal mesh, 19 mm mesh;
.2 net free area corresponding to at least 80% of the area of the fan openings;
.3 securely in place;
.4 removable for maintenance.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Fasten devices and components securely in place.

.2 Appliances and components must be removable for maintenance purposes, and easy to replace and fix in place.

.3 Electrical work must be carried out in accordance with Division 26.

3.2 ON-SITE QUALITY CONTROL

.1 Carry out quality control in accordance with general regulations.

.2 Start-up in accordance with general instructions.

.3 On-site tests: carry out the following tests in accordance with the general requirements and submit reports in accordance with the requirements set out in the DOCUMENTS/SAMPLES TO BE SUBMITTED section of PART 1:
.1 Using a specially calibrated gauge, adjust belt tension in accordance with manufacturers' recommendations, before start-up and after 100 h of initial operation.

.4 At the engineer's request, carry out temperature rise and insulation resistance tests and any other tests that may be necessary to determine the motor's condition, and if it proves defective, it will be replaced at no extra charge. Noisy or excessively vibrating motors, in the opinion of the engineer, will be replaced at no additional charge.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society of Mechanical Engineers (ASME).
.1 ASME B40.100, Pressure Gauges and Gauge Attachments.
.2 ASME B40.200, Thermometers, Direct Reading and Remote Reading.

.2 Canadian General Standards Board (CGSB).
.1 CAN/CGSB-14.4, Indicating Thermometers, Liquid Expansion in Glass Sheath, Commercial/Industrial Type.
.2 CAN/CGSB-14.5, Bimetallic Indicating Thermometers commercial/industrial type.

1.2 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit documents and samples in accordance with general requirements.

.2 Submit manufacturers' data sheets for the following measuring instruments, devices and components:
.1 thermometers;
.2 pressure gauges;
.3 shut-off valves;
.4 siphons;
.5 thermowells;
.6 etc.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Thermometers and manometers should be selected with the measuring point at the center of the graduated range.

.2 Operating temperature/pressure ranges: see pump diagrams and tables.

2.2 THERMOMETERS FOR DRINKING WATER

.1 55 mm x 55 mm digital thermometer with 25 mm x 12 mm rectangular display, 0.5°C accuracy, quick and easy changeover of measurement units (°C/°F), sealed probe, NSF-approved, light/solar energy, can operate at a minimum of 15 lux, direct pipe mounting.

.2 Acceptable products: Weiss 56SD-U or approved equivalent.

2.3 DIRECT-READING THERMOMETERS

.1 Industrial thermometers, variable reading angle, liquid expansion, 230 mm scale length, compliant with CAN/CGSB 14.4 and ASME B40.200 standards.
.1 Acceptable products: Trerice BX9 or approved equivalent.

2.4 REMOTE THERMOMETERS FOR DRINKING WATER

.1 55 mm x 55 mm digital thermometer with 25 mm x 12 mm rectangular display, 0.5°C accuracy, quick and easy changeover of measurement units (°C/°F), sealed probe, NSF-approved, light/solar energy, can operate with a minimum of 15 lux, wiring long enough to allow installation of display 1.8 m from the floor, display wall-mounting.

.2 Acceptable products: Weiss 56SD-F or approved equivalent.

2.5 TELETHERMOMETERS

.1 Dial-type, 114 mm diameter, liquid expansion thermometers, CAN/CGSB-14.5 compliant, accurate to within one division of the measuring range, with brass movement, stainless steel capillary, stainless steel spiral sheath, stainless steel bulb and polished stainless steel case, for surface mounting.
.1 Acceptable products: Weiss 45BL, or approved equivalent.

2.6 THERMOWELLS

.1 For copper pipes :
.1 Copper or bronze wells.
.2 For drinking water: NSF approved.

.2 For steel pipes: brass or stainless steel shafts.

.3 For stainless steel pipes: stainless steel shafts.

2.7 PRESSURE GAUGES FOR DRINKING WATER

.1 Dial-type pressure gauges, 100 mm diameter, ASME B40.1 compliant, NSF approved, in stainless steel (internal and external (Bourdon tube, case, etc.), with Lexan window.

.2 Acceptable products: Weiss 4CTSLF, or approved equivalent.

2.8 GAUGES

.1 Liquid-filled pressure gauges (except for steam), 100 mm diameter dial type, compliant with ASME B40.100, category

2A, in stainless steel (internal and external (Bourdon tube, case, etc.).
.1 Acceptable products: Ashcroft 1008SL and 1008S for steam, Weiss LF4S-2, or approved equivalent.

.2 The following features or elements must be provided, as appropriate:
.1 a siphon for steam systems;
.2 a damper for networks subject to pressure pulsations;
.3 a membrane separator for corrosive fluids;
.4 a safety collar and vent at the rear, and a reinforcing bead at the front;
.5 a bronze shut-off valve.

PART 3 - EXECUTION

3.1 GENERAL

.1 Position instruments so that they can be read from the floor or operating platform. Alternatively, install telethermometers and telemanometers meters.

.2 Install the instruments between the devices and the first downstream or upstream fitting, as appropriate.

3.2 THERMOMETERS

.1 Place thermometers in thermowells lined with thermally conductive material.

.2 Install thermometers in the indicated locations and at the inlet and outlet of the following devices:
.1 heat exchangers;
.2 heating or cooling coils;
.3 boilers (hot water);
.4 chillers and refrigeration units;
.5 cooling towers;
.6 domestic water heaters.

.3 Where indicated, install thermowells for system balancing or operational verification purposes only.

.4 Use extension leads when thermometers are installed on insulated pipes.

3.3 GAUGES

.1 Install pressure gauges where indicated and at the following locations:
.1 suction and discharge sides of pumps;
.2 upstream and downstream of pressure reducing valves;
.3 sprinkler system alarm valves;
.4 at the inlet and outlet of heating or cooling coils;
.5 at heat exchanger inlets and outlets;
.6 at the boiler outlet;

.7 to the domestic water inlet;
.8 at cooler inlet and outlet.

.2 Where indicated, fit manometers with a shut-off valve to balance the system.

.3 Use extension leads when pressure gauges are installed on insulated pipes.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society of Mechanical Engineers (ASME)
.1 ASME B31.1, Power Piping.

.2 ASTM International
.1 ASTM A 125, Standard Specification for Steel Springs, Helical, Heat-Treated.
.2 ASTM A 307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
.3 ASTM A 563, Standard Specification for Carbon and Alloy Steel Nuts.

.3 Factory Mutual (FM)

.4 Underwriters' Laboratories of Canada (ULC)

.5 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
.1 MSS SP 58, Pipe Hangers and Supports - Materials, Design and Manufacture.
.2 MSS SP 69, Pipe Hangers and Supports - Selection and Application.
.3 MSS SP 89, Pipe Hangers and Supports - Fabrication and Installation Practices.

.6 National Fire Prevention Association (NFPA)
.1 NFPA 13, Standard for the Installation of Sprinkler Systems.

1.2 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit documents and samples in accordance with general requirements.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

.1 Design requirements
.1 Piping must be supported in accordance with the manufacturer's recommendations, using standard parts, components and connections.
.2 Maximum load ratings should be determined on the basis of the permissible stress indications contained in ASME B31.1 or MSS SP 58.
.3 Supports, guides and anchors must not transmit too much heat to the building's framing elements.

.4 Supports and hangers must be designed to support piping and mechanical equipment under operating conditions, allow for contraction and expansion movements of the supported elements, and prevent excessive stresses on the piping and equipment to which they are connected.
.5 Brackets and hangers must be vertically adjustable after installation and during commissioning. The extent of adjustment must comply with MSS SP 58.

2.2 GENERAL

.1 Supports, hangers and bracing must be manufactured in accordance with ANSI B31.1 and MSS SP 58.

.2 All brackets must include at least the following three parts: anchor sleeve, suspension rod, clamp or bracket.

.3 All anchors installed in concrete structures must be approved to withstand seismic loads, including those used for gravity supports. Anchor sleeves are therefore not permitted.

.4 Suspension brackets on fire protection systems must be installed in accordance with applicable NFPA standards.

.5 All brackets and hangers must be :
.1 UL listed for Canada.
.2 FM-approved, for all fire protection systems.

.6 The elements covered by this section are to be used for support purposes only. They must not be used to lift, hoist or mount other components or equipment.

2.3 PIPE HANGERS

.1 Finish
.1 Brackets and hangers must be galvanized.
.2 Elements must be galvanized by electroplating or hot-dip galvanizing.
.3 For stainless steel piping, complete bracket/suspension systems must be made of stainless steel, where available.
.4 Black steel rods only will not be accepted.
.5 For uninsulated copper pipes, use copper-plated supports. In the absence of such a support, steel hangers which come into contact with copper piping must be copper-plated or coated with epoxy resin.

.2 Anchoring elements for suspensions attached to the bottom flange of an I-beam
.1 Cold pipes with nominal diameters of DN 2 or less: malleable iron C-flanges with hardened steel socket set screws, carbon steel locknut and clamp.
.2 Chilled pipes with nominal diameters equal to or greater than DN 2 1/2 and hot pipes of any diameter: beam clamps, consisting of a malleable cast-iron jaw, eyebolt and extension,

with clamp, suspension rod, nuts and washers in carbon steel, in compliance with MSS SP 58.

.3 Anchoring elements for suspensions attached to the top flange of an I-beam
.1 Chilled pipes with nominal diameters of DN 2 or less: ductile cast-iron C-frame top flanges with hardened steel socket set screws, carbon steel locknut and clamp, in compliance with MSS SP 58.
.2 Cold pipes with nominal diameters equal to or greater than DN 2 1/2 and hot pipes of all diameters: malleable cast-iron top-of-beam fasteners, consisting of a jaw, a hook rod, a spring washer, a plain washer and a nut, in compliance with MSS SP 58.

.4 Anchoring elements for suspensions in concrete structures
.1 Ceiling anchors: bracket, plate, fastener, dowels and welded eyebolt in galvanized carbon steel, with eyebolt nut in seamless, galvanized forged steel. The diameter of the eyelet must be at least 6 mm greater than that of the rod.
.2 Brackets for embedding in concrete: with wedge and protective plate with break-off pad, in compliance with MSS SP 58.

.5 Suspension rods: threaded, adjustable, MSS SP 58 compliant.
.1 Suspension rods must not be subjected to forces other than tensile forces.

.6 Support elements: MSS SP 58 compliant.
.1 For stationary steel pipes:
.1 Galvanized carbon steel elements.
.2 Acceptable products: "Anvil" fig. 260; "Hilti"; "Myatt"; "Tolco".
.2 For stationary copper piping :
.1 Black steel elements with copper finish.
.2 Acceptable products: "Anvil" fig. CT-69; "Hilti"; "Myatt"; "Tolco".
.3 Protective shields must be provided for insulated pipes.
.4 Support elements must be oversized to allow for thermal insulation.
.5 Where necessary, hinge elements should be provided to allow both horizontal and vertical movement of the supported pipe.

.7 Adjustable stirrups: MSS SP 58-compliant, with spacer bolt, vertical adjustment nut and locknut.

.8 Roller calipers :
.1 With yoke, carbon steel shaft and nuts and cast-iron roller, in compliance with MSS SP 58.
.2 Acceptable products: "Anvil" fig. 177;

.9 U-bolts: carbon steel, conforming to MSS SP 58, with two (2) ASTM A 563 nuts at each end.

.1 Finish for steel pipes: galvanized finish.
.2 Finish for copper, glass, brass or aluminum pipes: galvanized finish, with plastic-coated or epoxy resin-coated formed part.

.10 Roller bases :
.1 With cast-iron base and roller and carbon steel support rod, in compliance with MSS SP 58.
.2 Acceptable products: "Anvil" fig. 271;

.11 Pipe support for expansion and contraction with cast-iron stirrup and roller with metal saddles.

2.4 WALL MOUNTS

.1 Use to support non-expanding pipes only.

.2 Description :
.1 C-profile rail-mounted fastening system with curved edges;
.2 In galvanized or stainless steel.
.3 Clamps or fasteners appropriate to the pipe to be supported.
.4 Mounting plate in appropriate locations.

.3 Leave a gap of 25 mm or more, as required, to allow for lagging.

.4 Acceptable products: "POWER-STRUT"; "Hilti"; "Anvil" or approved equivalent.

2.5 RISER CLAMPS

.1 Steel and cast-iron piping :
.1 Galvanized carbon steel clamps
.2 Compliant with MSS SP 58, type 42.
.3 Acceptable products: "Anvil" fig. 261, "Hilti," "Myatt," "Tolco" or approved equivalent.

.2 Copper piping :
.1 Copper-finish carbon steel collars
.2 Compliant with MSS SP 58, type 42.
.3 Acceptable products: "Anvil" fig. CT-121; "Hilti"; "Myatt"; "Tolco".

.3 Bolts: comply with ASTM A 307.

.4 Nuts: ASTM A 563 compliant.

2.6 HARNESSES AND PROTECTIVE SHIELDS

.1 Insulated cold pipes
.1 Protective shields for heat insulators
.2 Compliant with MSS SP 58
.3 Galvanized carbon steel sheet

.4 Covering half the insulation perimeter
.5 Length calculated for spans up to 3 m, minimum 305 mm.
.6 Acceptable products: "Anvil", fig. 167; "Hilti"; "Myatt"; "Tolco".

.2 Insulated hot pipes
.1 Curved plate shields
.2 With raised edges
.3 In carbon steel
.4 Compliant with MSS SP 58
.5 Length 300 mm
.6 With welded central reinforcement for pipes with nominal diameters equal to or greater than DN 12.
.7 Acceptable products: "Anvil" figs. 160 to 165; "Myatt"; "Tolco".

2.7 APPLIANCE SUPPORTS

.1 If not supplied by the appliance manufacturer, support elements must be made of structural steel.

.2 These supports will be made of welded metal sections and built in accordance with good engineering practice and provincial codes. This work will be carried out by welders and qualified workers.

2.8 ANCHOR BOLTS AND JIGS

.1 Provide templates to determine the exact location of the anchor bolts.

2.9 MOUNTING BASES

.1 For frame-mounted devices: concrete bases at least 100 mm high, 150 mm higher than the device frame, with chamfered edges.

.2 Concrete: see structural engineer's plans. Coordinate exact location and dimensions of bases.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Anti-vibration devices
.1 Install anti-vibration devices at pumps, boilers, refrigeration units, cooling towers and other specified locations.

.2 Use adjustable suspension brackets on horizontal piping.

.3 Riser clamps

.1 Secure risers independently of the horizontal pipes to which they are connected, using clamps and shear pins welded to the riser.
.2 Tighten bolts to current torque.
.3 For steel pipes, install clamps under a coupling or shear pin.
.4 For cast-iron pipes, install clamps below a gasket.
.5 Vertical piping is securely fastened at the base of the column and at floor level on all floors; the maximum distance between two supports must never exceed 4,500 mm.

.4 Anchoring elements for suspensions in concrete structures
.1 Fasten the elements (plates and stirrups) in the concrete structure with at least one (1) at each corner.

.5 Attach hangers to framing elements. In this regard, supply and install any additional metal framing members required if there are no structural supports in place at the intended installation points, or if the anchor sleeves are not located where required.

.6 Horizontal cast-iron piping will be supported by means of two supports per pipe section and on each side of the joints. Supports on cast-iron piping DN6 and under will be specially designed steel, and supports on cast-iron piping DN8 and over will be specially designed cast-iron saddles.

.7 Anchoring sleeves :
.1 Coordinate the installation of anchor sleeves in concrete with the structural engineer, and install them according to his recommendations.
.2 Obtain permission before using vertical expansion anchor sleeves.
.3 Use at least two sockets to hold each bracket.
.4 Do not hang anything from the metal deck.

3.2 SPACING BETWEEN SUPPORTS AND HANGERS

.1 Plumbing system piping: comply with the requirements specified in the Plumbing Code and the specifications.

.2 Fire protection system piping: in accordance with fire code requirements and NFPA 13.

.3 Oil and gas pipes with a nominal diameter of DN 1/2 or less: one (1) support/suspension every 1.8 m.

.4 Copper pipes with nominal diameters equal to or less than DN 1/2: one (1) support/suspension every 1.5 m.

.5 Support plastic pipes according to manufacturer's recommendations.

.6 Pipes with rolled grooved ends and flexible joints: as shown in the table below, with at least one (1) support/suspension at each joint. The table applies to straight sections with no load concentration and where complete linear movement is not required.

.7 One (1) support/suspension not more than 300 mm from each elbow.

.8 Pipe suspension table :

Nominal diameter pipe DN	Stem diameter	Maximum spacing	
		Steel	Copper
up to 1 - 1/4	10 mm	2,1 m	1,8 m
1 - 1/2	10 mm	2,7 m	2,4 m
2	10 mm	3,0 m	2,4 m
2 - 1/2	10 mm	3,6 m	3,0 m
3	10 mm	3,6 m	3,0 m
3 -1/2	10 mm	3,6 m	3,3 m
4	16 mm	3,6 m	3,6 m
5	16 mm	4,3 m	
6	22 mm	4,3 m	
8	22 mm	4,3 m	
10	22 mm	4,9 m	
12	22 mm	4,9 m	

.9 For pipes with nominal diameters greater than DN 12, comply with MSS SP 58.

.10 The spacing between grouped pipe supports is determined by the smallest pipe.

3.3 SUSPENSION INSTALLATION

.1 Install hangers in such a way that the rods are vertical under operating conditions.

.2 Adjust the height of the rods so that the load is evenly distributed between the hangers.

3.4 DIELECTRIC CONNECTIONS

.1 Supply and fit felt or rubber gaskets to prevent contact between components made of dissimilar metals.

.2 Self-adhesive ribbons will not be accepted.

3.5 HORIZONTAL MOVEMENT

.1 The obliquity of the suspension rods resulting from the horizontal movement of the pipe from the "cold" to the "hot" position must not exceed 4 degrees from the vertical.

.2 When the horizontal movement of the pipe is less than 13 mm, offset the supports or hangers so that the rods are vertical in the "hot" position.

3.6 FINAL ADJUSTMENT

.1 Supports and suspensions
.1 Ensure that pipe suspension rods are in a vertical position under operating conditions.
.2 Balancing loads.

.2 Adjustable stirrups
.1 Tighten the vertical adjustment nut to optimize caliper performance.
.2 Retighten locknut when adjustment is complete.

.3 C-clamps
.1 Fasten the C-clamps to the bottom flange of the beams in accordance with the manufacturer's recommendations, and tighten to the torque specified by the manufacturer.

.4 Beam fasteners
.1 Using a hammer, firmly secure the clamp to the bottom flange of the beam.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.1 REFERENCES

.1 Canadian Standards Association (CSA)/CSA International
.1 CSA G40.20/G40.21, General requirements for rolled or welded structural steel.

.2 Quebec Construction Code (CCQ)

.3 National Fire Protection Association (NFPA)
.1 NFPA 13 - Standard for the Installation of Sprinkler Systems.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

.5 Seismic Restraint Manual Guidelines For Mechanical Systems, from SMACNA.

1.2 DEFINITION

.1 SPP: seismic protection system.

1.3 DESCRIPTION

.1 Design, supply and install a complete and functional seismic-resistant fastening system for mechanical and electrical equipment (new and/or relocated).

.2 Seismic protection systems must be compatible with and fully integrated into the following:
.1 prescribed acoustic and anti-vibration devices;
.2 the building's design features;
.3 electrical and mechanical installations.

.3 Protected equipment and systems need not remain in operation during and after an earthquake.

.4 During an earthquake, seismic protection devices and systems are used to prevent equipment and appliances from shifting, falling or tipping over, which could injure occupants.

.5 The design of seismic protection devices and systems must be entrusted to an engineer specializing in earthquake engineering, recognized in the province of Quebec and a member in good standing of the Ordre des Ingénieurs du Québec. Project requirements must be determined by the same engineer.

.6 Any installed device that is to be suspended or removed and weighs more than 10 kg must be securely fastened in accordance with these requirements.

.7 Any device installed on a suspended ceiling that is not earthquake-approved and weighing less than 10 kg must be suspended independently of the ceiling.

.8 It is the responsibility of the seismic engineer to determine whether the building is a civil protection building.

.9 It is the responsibility of the seismic engineer to determine the connection points of seismic protection devices and systems to the building's structure, in order to ensure the latter's resistance.

1.4 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit documents and samples in accordance with general requirements.

.2 Shop drawings: submitted shop drawings must bear the seal and signature of a qualified earthquake engineer licensed to practice in the province of Quebec.

.3 Submit the calculation data below.
.1 Working drawings (of the same quality and format as the drawings forming part of the tender documents), lists of materials and equipment, schematic representations and detailed specifications for the components of each of the seismic protection devices and systems planned.
.2 Separate shop drawings for each seismic protection device or system, and for each of its components.
.3 A document specifying the location of these devices and systems.
.4 Lists of the different types of seismic protection devices and systems and their related components.
.5 A document showing or indicating details of anchoring and fastening devices, anchoring loads and methods of connection to framing elements.
.6 A document specifying installation instructions and methods.
.7 Conservative or simplifying assumptions can be accepted.

.4 In the event that no seismic protection system is required, provide the Consultant with a letter of explanation signed by the seismic engineer, specifying the reasons, including the sections of the Code permitting it.

1.5 DOCUMENTS TO BE SUBMITTED ON COMPLETION OF WORK

.1 Submit the required documents in accordance with general requirements.

.2 Upon completion of the certification and acceptance of the report, provide the Consultant with a complete copy of the revised and annotated project file to show post-execution conditions.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Seismic protection devices and systems must :
.1 Be designed to prevent shock effects.
.2 Act in all directions.

.2 Mounting brackets must be connected to the building structure.

.3 Fixings and connection points must be able to withstand the same maximum loads as earthquake-resistant devices and systems.

.4 Seismic devices and systems designed to protect piping systems must meet the requirements for anchoring and guiding piping systems.

.5 Seismic protection devices and systems made of cast iron, threaded tubes or other frangible materials will not be accepted.

.6 Connecting seismic protection devices and systems to reinforced concrete frames
.1 The anchors used must be seismically approved by the manufacturer.
.2 Anchors must not be installed using a nail gun or in holes drilled for this purpose.

.7 Seismic protection devices and systems must not interfere with the operation of fire-stop elements or compromise their integrity.

.8 Coordinate the design of seismic protection systems with section 23 05 48 - Anti-vibration systems and devices for HVAC piping and equipment.

2.2 ENTRY OF UTILITY LINES INTO THE BUILDING

.1 Provide means to ensure pipe flexibility to prevent breakage in the event of an earthquake.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Retaining cables
.1 Connect the retaining cables to the suspended devices so that their axial incidence corresponds to the center of gravity of the protected devices.
.2 Use grommets, lugs and other appropriate hardware to ensure alignment of seismically-qualified devices and systems, and to prevent cables from bending at connection points.
.3 In the case of pipe or duct networks, install transverse supports/bracing at intervals of no more than 12 m, and longitudinal supports/bracing at intervals of no more than 24 m, or within the limits imposed by their performance characteristics or those of the anchoring devices.
.4 For seismic protection purposes, small-diameter pipes may be secured to larger-diameter pipes; however, the reverse practice is not permitted.
.5 For ceiling-mounted equipment, lay the retaining cables at a 90-degree angle to each other (in the plane), and fasten them to the building structure at a 64-degree angle (2:1 slope).
.6 Tighten cables to reduce slack. Under normal operating conditions, the cables should not support the weight of the equipment held.

.2 Install seismic devices and systems at least 25 mm away from all appliances and utility lines.

.3 Coordinate connection operations with other trades.

.4 For fire protection systems :
.1 Seismic protection systems must also be installed in accordance with NFPA 13.

3.2 ON-SITE QUALITY CONTROL

.1 Carry out quality control in accordance with general regulations.

.2 Inspection and certification of earthquake protection devices and systems
.1 During construction or after installation, as the case may be, seismic protection devices and systems must be inspected and certified by the design engineer specializing in earthquake engineering or his representative.
.2 Provide the Consultant with a written report accompanied by a certificate of compliance signed by the earthquake design engineer certifying that the installations have been installed in accordance with his specifications.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Gas Association (CGA)
.1 CSA/CGA B149.1, Natural Gas and Propane Installation Code.

.2 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-1.60, Interior gloss enamel paint with alkyd resins.
.2 CAN/CGSB-24.3, Pipe network identification.

.3 National Fire Protection Association (NFPA)
.1 NFPA 13, Standard for the Installation of Sprinkler Systems.
.2 NFPA 14, Standard for the Installation of Standpipe and Hose Systems.

1.2 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit documents and samples in accordance with general requirements.

.2 Samples
.1 Submit samples of reported tic plates, nameplates and labels, together with lists of proposed legends.

PART 2 - PRODUCTS

2.1 MANUFACTURER NAMEPLATES

.1 Metal or laminate nameplates, mechanically attached to hardware by the manufacturer.

.2 Lettering and numerals must be raised or recessed.

.3 The following information, as applicable, must be indicated on the nameplates.
.1 Device: manufacturer, model, dimensions, serial number, power, flow rate.
.2 Motor: voltage, frequency of supply current, number of phases, power, type of service, frame dimensions.

.4 CSA and ULC certification plates: as required by these organizations.

.5 Format according to location
.1 Number 5 plates for terminal elements and control panels.

.2 Number 9 plates for equipment located in mechanical plant rooms.

2.2 IDENTIFICATION WITHIN THE EXISTING SYSTEM

.1 Identify added or upgraded structures according to the existing identification system.

.2 Where the existing identification system does not provide for the identification of newly installed structures, these must be identified in accordance with the provisions of this section.

.3 Before starting work, have the identification system approved in writing by the Consultant.

2.3 PIPING SYSTEMS GOVERNED BY CODES

.1 Identification
.1 Natural gas: as per CSA/CGA B149.1.
.2 Propane gas: in accordance with CSA/CGA B149.1.
.3 Sprinklers: in accordance with NFPA 13.
.4 Riser and armoured valve installations: in accordance with NFPA 14.

2.4 PIPE IDENTIFICATION

.1 The fluid conveyed in the piping system must be identified by colored background markings, pictograms (if necessary) and/or legends; the direction of flow must be indicated by arrows. Unless otherwise specified, piping systems must be identified in accordance with CAN/CGSB 24.3.

.2 Legend: capital letters of the following dimensions:

Pipe outside diameter or insulation (mm)	Letter dimensions (mm)
19 à 32	13
38 à 51	19
64 à 150	32
200 à 250	64
More than 250	89

.3 Pictograms
.1 Where applicable, pictograms must comply with Workplace Hazardous Materials Information System (WHMIS) requirements.
.2

.4 Legends
.1 Upper-case letters of height and color in compliance with CAN/CGSB 24.3.

.5 Arrows indicating flow direction
.1 Outer diameter of pipe/liner less than 75 mm: 100 mm long x 50 mm high;
.2 Outer diameter of pipe/liner 75 mm and over: 150 mm long x 50 mm high;
.3 Double-pointed arrows when flow direction is reversible.

.6 Dimensions of background color markings
.1 Height: sufficient to cover the circumference of the pipe/calorifuge.
.2 Length: sufficient to accommodate the pictogram, legend and arrows.

.7 Materials for background color markings, lettering (legends) and arrows
.1 Tubes and pipes up to 20 mm in diameter: plastic, self-adhesive, water-repellent and heat-resistant labels.
.2 Other hoses: self-adhesive, plastic-coated canvas labels with protective coating and water-repellent contact adhesive on the underside, designed to withstand 100% relative humidity, 150 degrees Celsius constant heat and 200 degrees Celsius intermittent heat.
.3 Acceptable products: "W.H.", "Brady Inc.", "Seton Name Plate Corp", "VMAP".

.8 Painting :
.1 Complies with CAN/CGSB-1.60.
.2 Natural gas and propane gas
.1 Paint the entire network with two coats of anti-rust paint.

.9 Background colors and captions
.1 Where background colors and captions are not specified, follow the Consultant's instructions.
.2 Fire protection: white on red background.
.3 Medical gases: see Table 6 of N.Q. 5710-500.
.4 Legend and arrow colors: see table below.

Background color	Legends, arrows
Yellow	BLACK
Green	WHITE
Red	WHITE

.5 Background color markings and legends for pipes and valves.

Content/Fluid conveyed	Background color	Legend
Natural gas (indicate pressure) kPa	According to code	G. N. [_____] kPa
Ventilation - gas pressure regulator	According to code	VENTIL. REGULATOR

2.5 IDENTIFICATION OF AIR DUCTS

.1 50 mm high letters and arrows indicating direction of fluid flow, 150 mm long x 50 mm high, with self-adhesive labels.

.2 Color: black or a color contrasting with that of the conduit.

2.6 IDENTIFYING VALVES AND FITTINGS

.1 3 mm-thick plates in laminated plastic or white anodized aluminum, with matte finish, square corners and precisely aligned, machine-engraved letters right down to the core.

.2 The color of the lettering will be black, except for fire protection systems where it will be red.

.3 The nameplate should indicate the function of the valve and what it controls.

.4 The plate is held in place by a brass chain.

.5 Provide, for each system, six (6) block diagrams in an approved format, with diagrams and lists of labeled components, specifying the designation number, type of valves, system, function, location and normal operating position of the components.

2.7 IDENTIFICATION OF NETWORKS AND CONTROL DEVICES

.1 Identify networks, devices, components, controllers and sensors by means of identification plates complying with the requirements of this section.

.2 Identify the function of each and (if applicable) their safety settings.

.3 Low-voltage wiring and control air tubes (instrumentation): as per Division 25.

2.8 PROTECTION OF TRAFFIC AREAS

.1 Self-adhesive vinyl warning tape-, 75 mm (3") high. Alternating yellow and black oblique stripes.

2.9 UNDERGROUND PIPELINE

.1 75 mm wide, rot-proof, magnetic plastic warning tape for tracking and identification, detectable by electronic detector.

.2 Yellow ribbon with black service inscription running the full length of the ribbon.

.3 The colored coating applied to the code and inscription must be resistant to moisture and other substances contained in the backfill material.

2.10 UNILINGUAL/BILINGUAL ENTRIES

.1 The inscriptions used to identify systems and components must be written in English and French.

PART 3 - EXECUTION

3.1 TIME OF EXECUTION

.1 Do not start identifying networks and devices until the work specified in section 09 91 23 - Painting - New interior work has been completed.

3.2 INSTALLATION

.1 Unless otherwise specified, identify networks and devices in accordance with CAN/CGSB-24.3.

.2 Provide ULC and CSA certification plates as required by the respective organizations.

.3 Place tape or strips on clean, grease- and dust-free surfaces. Wrap the tape around the pipe, overlapping the ends to a length equivalent to the pipe diameter.

3.3 IDENTIFICATION PLATES

.1 Location
.1 Placards must clearly identify devices and/or piping networks, and must be installed in places where they are clearly visible and easily legible from the work floor.

.2 Spacer blocks
.1 On hot and/or heat-insulated surfaces, use spacers under the nameplates.

.3 Protection
.1 Do not apply paint, thermal insulation or any other coating to the nameplates.

.4 Equipment

.1 Identify boilers, burners, pumps, compressors, chillers, water towers, exchangers, tanks, condensers, alarm valves, test valves, drain valves, ventilation systems (modular groups), air-conditioning units, all individually installed central ventilation equipment such as fans, coils, filters, recuperators, humidifiers as well as control panels and any other central equipment.

.2 Boilers must be identified at the front and rear to enable operators to carry out manoeuvres without risk to themselves.

3.4 LOCATION OF PIPE AND AIR DUCT IDENTIFI CATION ELEMENTS

.1 On long pipes and ducts in open areas of boiler rooms, equipment rooms, technical galleries and tunnels: at intervals not exceeding 10 m, so that at least one can be easily seen from any point in the operating areas or aisles.

.2 Changes of direction.

.3 In every small room where pipes or air ducts run (at least one element).

.4 On either side of visual obstacles or where it is difficult to follow the layout of the networks.

.5 On either side of partitions, such as walls, floors or partitions.

.6 Where piping or air ducts are concealed in recesses, ceiling voids, shafts, galleries or other confined spaces, at entry and exit points, and near inspection openings.

.7 At the start and end of every pipe or conduit, and near every piece of equipment.

.8 Immediately upstream of the main manually or automatically operated valves or registers, otherwise as close as possible, preferably on the upstream side.

.9 So that the designation is easily legible from the usual operating areas and from all easily accessible points.

.10 Perpendicular to the best possible line of sight, taking into account the usual location of operating personnel, lighting conditions, reduced visibility of colors or legends caused by dust and dirt accumulation, and the risk of damage or breakdown.

.11 In the case of underground pipelines, bury the pipe warning tape, inscription upwards, along the entire length of the pipeline route to a depth of 30 cm below the ground surface or below the surface of the subgrade under a hard surface.

.12 For air ducts :

.1 Place a plate near each duct access door or hatch.
.2 Stencil plates on final finish only.

3.5 LOCATION OF FIXTURE IDENTIFI CATION ELEMENTS

.1 Attach labels to fittings, except those connected to sanitary appliances or heating radiators, and unless they are in close proximity and view of the equipment to which they are connected.

.2 Install a copy of the block diagram and valve list, framed under non-glare glass, in a location determined by the Consultant. Also include a copy (in reduced format, if necessary) in each of the operation and maintenance manuals.

.3 Number the fittings in each network in order.

3.6 NON-VISIBLE EQUIPMENT

.1 Identify the location of any concealed ventilation equipment using P-Touch c/a 12 mm wide pressure-sensitive tape n^{o} TC-201 with black lettering on a white background on metal ceiling suspension with acoustic tiles or on the access hatch of drywall/gypsum ceilings.

3.7 TRAFFIC PROTECTION

.1 Install warning tape when the bottom of mechanical equipment (pipe, conduit, box, etc.) is installed between 1 m and 2 m (40" and 80") from the floor or obstructs normal traffic, thus providing limited headroom under the equipment. Protect protruding parts with 1" Armaflex insulation that conforms to the shape of obstructions.

.2 The ribbon will be installed across the full width of the passageway and on the lowest part of the equipment.

3.8 ON-SITE QUALITY CONTROL

.1 Carry out quality control in accordance with general regulations.

.2 Before completing the work, check that identification has been carried out in accordance with this section.

END OF SECTION

PART 1 - GENERAL

1.1 CONTENTS

.1 All articles of section 21 05 01 must be respected by this section.

.2 Testing, adjustment and balancing operations must be carried out in accordance with the requirements of the reference standards cited.
.1 Associated Air Balance Council, (AABC), National Standards for Total System Balance;
.2 ASHRAE (American Society of Heating, Refrigerating and Air Conditioning Engineers);
.3 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems.
.4 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing.

1.2 SCOPE OF D'ERE WORK

.1 Test, adjust and balance the systems, equipment, components and control devices specified in Division 23 over the entire operating range and under normal and emergency operating conditions.

.2 This work includes the following main items:
.1 Balancing the airflow rates of all ventilation and/or air-conditioning systems to comply with calculations, recording adjustments and leaving systems in balance.
.2 Check calibration of control equipment (flow measurements).

.3 Coordinate and collaborate with responsible contractors :
.1 Ventilation and air conditioning, section 23 05 00.03.
.2 Regulation and control systems, division 25.

.4 To prepare a complete quotation, please consult all mechanical drawings and specifications (including addenda). See table of contents.

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit documents and samples in accordance with general specifications.

.2 Before undertaking any EE operations, submit the following:

.1 the proposed method for testing, adjusting and balancing systems, if it differs from the method described in the standards or reference documents cited;
.2 data sheets for each reading device used for testing. This data must include device name, manufacturer, equipment model and last calibration certificate;
.3 sample report formulas. These formulas must meet AABC standards.

.3 Wait for the engineer's authorization before starting work following agreement on the procedures submitted.

1.4 QUALIFICATIONS OF ERECTION PERSONNEL

.1 Testing, adjustment and balancing will be carried out by a firm specializing in this type of work.

.2 The contractor must be accredited by the following organizations: AABC or NEBB.

.3 Testing and balancing personnel must be :
.1 An expert in the field, with at least five (5) years of proven experience in the execution of work of the type and scope described herein.
.2 Qualified to balance mechanical installations according to the methods cited in this clause.

.4 The Consultant may at any time request the submission of documentation to confirm the competence and experience of the personnel.

1.5 COORDINATION

.1 During the construction phase, coordinate the location and installation or layout of the measuring devices, equipment, accessories, openings and connections required to carry out TAB operations.

.2 Notify the engineer in writing of any valves, shutters, controls, etc. you wish to have installed for your own work.

1.6 WORKSHOP AND EQUIPMENT DRAWINGS SUPPLIED BY OTHERS

.1 It is the responsibility of the contractor in this section to obtain shop drawings of the equipment and components to be balanced from other contractors. These documents must be obtained prior to any TAB work.

1.7 ERE OPERATIONS BEGIN

.1 Notify the Consultant seven (7) days before testing, adjusting and balancing.

.2 Undertake TAB operations only when the building is largely usable, i.e. when :
.1 installation of sealants, caulking and weatherstripping is complete;
.2 pressure, tightness and other tests prescribed in other sections of Division 23 have been completed;
.3 the equipment needed to carry out TEE operations is installed and in good working order;
.4 mechanical installations and related electrical and control systems that may affect the outcome of TAB operations are operational and have been checked for proper operation, including the following.
.1 Thermal overload protection for electrical equipment in place.
.2 Air networks
.1 Clean air ducts.
.2 Airtight ducts, sheaths and plenums within prescribed limits.
.3 Fans turning in the right direction.
.4 Volume dampers and fire and smoke dampers in place and open.
.5 Coil fins, clean and straightened.
.6 Doors and hatches installed and closed.
.7 Outlet vents installed and volumetric dampers open.

1.8 SETTING TOLERANCES

.1 Test, adjust and balance systems until results show no more than the following deviations, plus or minus, from theoretical values.
.1 Ventilation systems :
.1 Grilles and diffusers: plus 10%, minus 0%;
.2 Systems: plus 5%, minus 0%;
.3 The permissible deviation may be positive (more air than specified) but must never be negative (less air than specified).

1.9 PRECISION TOLERANCES

.1 Measured values must match actual values to within plus or minus 2%.

1.10 PRELIMINARY REPORT NAIRE D'ERE

.1 Before formally submitting the EIA report, submit a preliminary PDF report to the Consultant for verification and approval.

1.11 EARLY REPORT

.1 Results must be expressed in SI units in the report, which must also include the following:
.1 data sheets for each reading device used;

.2 the EE method used;
.3 the calculation methods used;
.4 drawings to be included in the project file;
.5 schematic diagrams of the systems concerned.

.2 After the correction of the preliminary report following the comments of the Consultant submit :
.1 A PDF copy;
.2 In French;
.3 Presented on approved forms;
.4 In D-ring binders with tabbed dividers and alphabetical index.

.3 These reports will be certified by the technician who performed the tests and will state that the methods used and the results obtained comply with these specifications.

1.12 LEAK REPORTS

.1 Compile the observed flow readings for each system, compare them with the specified flow rates and check that duct leakage is within tolerable percentages.

.2 Include leakage calculations for each system in the report.

1.13 COMPLETION OF ERE OPERATIONS

.1 Repairs and retests must be completed before acceptance of the work.

.2 System testing, adjustment and balancing operations will not be considered complete until the final report has been approved by the Consultant.

1.14 AIR SYSTEMS

.1 Depending on the system, appliance, component or control/regulation device in question, the readings to be taken will include: air velocity, static pressure, flow rate, pressure drop, temperature (dry bulb, wet bulb, dew point), air duct cross-section, rotational speed, power demand, voltage, noise and vibration levels.

.2 The measuring points, in the case of devices, will be located in particular at the following places, as the case may be:
.1 inlets and outlets of registers, filters, heating and cooling coils, humidifiers, fans and any other devices that cause changes in conditions;
.2 controllers and controlled devices and appliances.

.3 In the case of systems, measurement points will be located at the following points, as appropriate: main air ducts, main and secondary bypass ducts, and supply ducts to terminal elements (grilles, register grilles or diffusers).

.4 Provide the following information for each air duct system:
.1 Installation instructions: system identification, names of manufacturers and model numbers of fans and motors, dimensions, layout and category of grilles, diffusers, location of devices and designation of rooms relevant to each measuring point.
.2 Design data: overall nominal flow rate, fresh air flow rate, total static pressure, motor power in HP, as well as voltage, number of phases and current in amperes, fan and motor speeds in rpm.
.3 Operating data: flow rates, intake, discharge and total static pressures for each fan, fan and motor speed in rpm, operating current in amperes for each phase, motor power and overload protection settings.
.4 Network diagram
.1 Complete network diagram showing design and actual flow rates at each air intake or outlet, with room and floor numbers.
.2 Air duct data: maximum and minimum air intake and exhaust rates for air ducts, pressure readings, sum of velocity measurements, average velocity, observed flow rate and design flow rate.
.3 Designation of air intakes, outlets and supply or extract vents; location and designation number.
.5 Designation, type and manufacturer's catalog number, relevant coefficients, designated surface area, design and observed speeds, orientation of deflector louvers or discharge cone.

1.15 OTHER REQUIREMENTS FOR ERE OPERATIONS

PART 2 - PRODUCTS

2.1 MEASURING INSTRUMENTS

.1 The instruments required for testing, adjusting and balancing equipment and systems will be supplied by the firm responsible for this work.

.2 Calibrate instruments within three (3) months prior to the start of TAB operations.

PART 3 - EXECUTION

3.1 INSTRUCTIONS

.1 An owner's representative can accompany the personnel responsible for adjusting and balancing the systems to familiarize them with the new systems and acquire the knowledge they need to operate them.

3.2 CARRYING OUT THE WORK

.1 Visit the site periodically (minimum 3 visits) to familiarize yourself with the systems and equipment, and ensure that instrumentation fittings and probe openings have been provided in the piping and ducts where required for the required readings. The contractor of this section will be responsible for any lack of accessories required for the proper execution of his work.

Perform this check on the plans and on site before the contractor's work is completed. Verify accessibility of adjustment parts. The contractor of this section will be responsible for any additional work required to complete the work in this section, such as the addition of balancing dampers that have not been requested prior to the completion of the work by the contractors of the other sections.

.2 Test, adjust and balance each separate system, then each system in relation to the associated systems, in the case of servo systems.

3.3 OPERATION OF EQUIPMENT AND SYSTEMS DURING ERE OPERATIONS

.1 Operate equipment and systems for the time required to perform TAB operations and for the time required by the Consultant to verify TAB reports.

3.4 START-UP

.1 Unless otherwise indicated, follow the start-up procedure recommended by the device and system manufacturer.

.2 Follow any special start-up procedures prescribed elsewhere in Division 23.

3.5 PROCEDURES : AIR SYSTEMS

.1 Check and balance air systems in accordance with the reference standards cited and the following requirements:

.1 Preliminaries :

.1 Use the manufacturer's data on all equipment to make the required calculations, unless tests show that the data cannot be obtained from the installation.

.2 Before balancing, temporarily obstruct filter sections to create an artificial static pressure drop corresponding to half the difference between the initial and final pressures recommended by filter manufacturers. Remove these obstructions after balancing.

.2 Main systems :

.1 Check and record make, model, serial number, pulley diameter, number and type of fan belts.
.2 Check, adjust and record revolutions.
.3 Check and record static pressure, both suction and discharge; in the case of air handling units, a complete analysis will be made; readings will be taken before and after each component (filters, humidifiers, cooling coils, silencers, etc.).
.4 Check, adjust and record air flow rates for specified quantities when the system is in recirculation and at 100% outside air.
.5 Check, adjust and record the position of the fresh air damper for the specified quantity.
.6 Check and record motor make, serial number, pulley diameter, revolutions, voltage, amperage and thermal protection number.
.7 Check and record air temperature (dry bulb and wet bulb) before and after air passes through the cooling coils.
.8 Check and adjust motorized dampers on mixing boxes.
.9 Take a flow reading and pressure measurements with the filters clean and simulating a filter dirt level at 50% of the maximum recommended pressure drop. Confirm instructions with the engineer to determine the condition in which the work will be carried out.
.10 Supply, modify and change, if required, fan pulleys and belts to meet specified flow rates.
.11 Adjust the motorized dampers to create the pressure drops required to obtain the airflows specified in the control sequences. Make these adjustments in coordination with the contractor responsible for regulation and control systems (division 25).

.3 Distribution :
.1 Check, adjust and record air flows in main supply and return ducts, zones and branches.
.2 Take Pitot tube readings in the main and secondary ducts to establish the exact performance of the installations.

.4 Limit switch units :
.1 Check, adjust and record the air flow supplied by the units and the static pressure upstream.

.5 Grilles and diffusers :
.1 Identify the location of each grille and diffuser with the room number concerned.
.2 Check, adjust and record flow rates at each grille and diffuser with room doors closed. Readings will show air velocity in m/s and flow rates required and observed after adjustment.
.3 Adjust grilles and diffusers to prevent draughts.

.6 Fans on variable volume systems (V.A.V.) with variable frequency drive :

.1 In addition to the procedure for the main systems, for each fan, measure air flow, amperage and static pressure at reduced speeds (minimum, 75% and maximum).

.1 For each speed, check, adjust and record the fresh air flows and damper position required to achieve the values specified on the drawings.

.2 When carrying out the procedure for main air systems (above), the end units must be 100% open, and the flow rate measured on those at the end of the network must correspond to the values shown on the drawing.

.1 If the fan flow rate does not correspond to the requested values, reduce the opening of certain limit switches until the requested flow rate is reached, using an iterative process.

.3 This data will be used by Division 25 to establish the modulation control for each fan.

3.6 PROCEDURES: HYDRAULIC SYSTEMS

.1 Check and balance water systems according to AABC manual recommendations and the following requirements:

.1 Preliminaries :

.1 Compile mechanical specifications for equipment to be tested.

.2 Open valves to 100%. Close coil bypass valves. Set mixing control for full flow through coil.

.3 Check expansion tanks for correct air/water ratio, and make sure the system is filled with water (i.e. free of air).

.4 Check that filters have been cleaned.

.5 Check the air eliminators at the high points of the water systems and make sure they are all installed and operating normally.

.2 Main equipment:

.1 Check and record the specified water flow rates (l/s) of the pumps.

.2 Check and record chiller water flow rates.

.3 Check and record supply and return temperatures of chiller evaporators and condensers. Adjust to specified temperatures.

.4 Check and record the make, power, rotation, suction and discharge pressure of each pump, at full and zero flow.

.5 Check and record the make, serial number, voltage and amperage of each pump.

.3 Distribution :

.1 Balance the water flow to each coil.

.2 For coils with automatic flow regulators, check flow rate and compare with specifications for 10% of regulators. Report data.

.4 Air handling units :

.1 When flow readings and coil tests are complete, indicate adjustments and record the following data:

.1 Water temperature at inlet and outlet of each heating and cooling coil.

.2 Pressure loss in coils at desired flow rate under 100% cooling and heating conditions.

.3 Adjust the pressure drop across the bypass valve to match the pressure drop across the coils at the desired flow rate.

.5 Checking cooling capacity :

.1 Carry out tests on chiller performance. installation. Run the tests for a period of operation at a stable load and record the following information:

.1 supply and return temperature to the evaporator;

.2 supply and return temperatures to the condenser;

.3 pressure at the evaporator inlet and outlet;

.4 pressure at condenser inlet and outlet;

.5 condenser and evaporator flow rates;

.6 amperage during testing;

.7 limit adjustment.

.6 Performance report :

.1 Calculate the refrigeration capacities using the observed readings and the power supplied for these capacities, and compare the results with the manufacturers' estimates to obtain the system's percentage efficiency.

3.7 PROCEDURES : AUTOMATIC CONTROL SYSTEM

.1 Check the calibration of flow controls and make a list of controls that will need to be recalibrated by division 25.

3.8 QUALITY CONTROL

.1 The measurements recorded may be verified by the Consultant.

.2 Provide the personnel and instruments needed to verify all recorded measurements (up to 50%), at the engineer's request and at no extra cost.

.3 The Consultant will determine the number of checks to be carried out and the location of the measuring points. These checks will be carried out in the presence of the Consultant.

.4 Resume testing, adjustment and balancing operations until results satisfy the DND Representative, and assume the costs of this work.

3.9 FINALIZATION

.1 Once the TIA operations have been completed to the Consultant's satisfaction, replace the drive or transmission guards, close the doors and inspection hatches, lock the control devices in the operating position and check that the sensors are set to the required setpoints.

.2 Permanently mark setting positions; these must not be erased or covered in any way.

END OF SECTION

PART 1 - GENERAL

1.1 CONTENTS

.1 Section contents
.1 Materials, equipment and pressure testing methods for supply, return or exhaust air ducts longer than [5] m, directly or indirectly connected to air handling equipment.

1.2 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
.1 Material Safety Data Sheets (MSDS).
.2 Sheet Metal and Air Conditioning Contractor's National Association (SMACNA).
.1 SMACNA HVAC Air Duct Leakage Test Manual.

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Supply documents and samples in accordance with general specifications.

1.4 QUALITY ASSURANCE

.1 Workforce qualification
.1 The installer must be an expert in the field, have at least three years' proven experience in carrying out work of the type and scope described herein, and possess the required qualifications.

PART 2 - PRODUCTS

2.1 TEST INSTRUMENTS

.1 Test instruments must include the following:
.1 a fan capable of providing the required static pressure;
.2 a section of pipe with precisely positioned pressure taps mounted on a calibrated orifice plate or diaphragm;
.3 a flow meter compatible with the depressor;
.4 calibration curves for the depressants used;
.5 a flexible sleeve for connection to the ductwork under test;
.6 smoke bombs for visual inspections.

.2 Test instruments used to measure flow and pressure must be accurate to within 3%.

.3 Submit details of the test instruments to be used to the engineer at least three months before the planned test date.

.4 Instruments must be calibrated, and the calibration certificate must be submitted to the engineer no later than 28 days before the start of testing.

.5 The instruments must then be recalibrated every six months.

PART 3 - EXECUTION

3.1 HOW TO PROCEED

.1 Comply with general regulations.

.2 The maximum length of conduits to be tested is determined by the characteristics of the test equipment.

.3 Tested conduit sections must include the following:
.1 fittings, branches and tappings.

.4 Repeat tests until prescribed pressures are reached. Pay for repairs and retesting, if necessary.

.5 Refer to SMACNA's HVAC Air Duct Leakage Test Manual for calculations relating to the various parts of the system.

.6 Plug leaks that can be detected by touch or hearing, regardless of their impact on the total leakage rate.

3.2 AIR DUCT SEALING TOLERANCES

.1 The tolerances specified below are expressed as a percentage of the total system flow rate. When testing pipe sections or parts of a system, the acceptable leakage rate must be proportional to that established for the system as a whole and must not exceed the total acceptable leakage rate.

.2 When testing the following ducts or duct systems, the acceptable leakage rate must not exceed the following values.
.1 Small duct networks up to 250 Pa: acceptable leakage rate of [2] %.
.2 VAV] boxes and downstream ducts: acceptable leakage rate of [2] %.
.3 Large networks of low-pressure ducts up to 500 Pa: acceptable leakage rate of [2] %.
.4 High-pressure ductwork up to 1000 Pa, including ducts upstream of VAV boxes: acceptable leakage rate of 2%.

.3 Test results must be evaluated on the basis of the following two basic parameters: effective duct surface area and duct pressure.

3.3 TESTING

.1 Test air ducts for leaks before installing lagging or concealing them in any way.

.2 Carry out tests when the sealants used are completely dry.

.3 Carry out tests under ambient temperature conditions which are not likely to affect the efficiency of seals and gaskets.

.4 Test the flexible sleeves connected to the VAV boxes.

END OF SECTION

PART 1 - GENERALITIES

1.1 REFERENCES

.1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
.1 ANSI/ASHRAE/IESNA 90.1-04, SI; Energy Standard for Buildings Except Low-Rise Residential Buildings.

.2 ASTM International Inc.
.1 ASTM B 209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
.2 ASTM C 335-05ae1, Standard Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
.3 ASTM C 411-05, Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.
.4 ASTM C 449/C 449M-00, Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.
.5 ASTM C 547-07e1, Standard Specification for Mineral Fiber Pipe Insulation.
.6 ASTM C 553-02e1, Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
.7 ASTM C 612-04e1, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
.8 ASTM C 795-03, Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
.9 ASTM C 921-03a, Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

.3 Canadian General Standards Board (CGSB)
.1 CGSB 51-GP-52Ma-89, Vapor-impermeable jacket and covering material for thermal insulation of pipes, ducts and equipment.

.4 Green Seal Environmental Standards (GSES)
.1 Standard GS-36-00, Commercial Adhesives.

.5 South Coast Air Quality Management District (SCAQMD), California State
.1 SCAQMD Rule 1168-A2005, Adhesive and Sealant Applications.

.6 Thermal Insulation Association of Canada (TIAC), National Insulation Standards (2005).

.7 Underwriters' Laboratories of Canada (ULC)
.1 CAN/ULC-S102-03, Standard Test Method; Surface Burning Characteristics of Building Materials and Assemblies.
.2 CAN/ULC-S701-05, Standard for Polystyrene Thermal Insulation, Boards and Pipe Coverings.

1.2 DEFINITIONS

.1 For the purposes of this section, the following definitions apply.
.1 DISSIMULATED" elements: insulated ducts and mechanical devices located above suspended ceilings or in inaccessible construction voids.
.2 APPARENT" elements: elements that are not concealed (as defined above).
.3 Laminated lagging: assemblies consisting mainly of the lagging itself, the fastening devices and the liner.

.2 ACIT codes
.1 CRD: Code Round Ductwork.
.2 CRF: Code Rectangular Finish.

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Provide the documents and samples required in accordance with the general specifications.

.2 Samples
.1 Submit a complete set of each type of lagging, including the lagging material itself, the coating and the adhesive.
.2 Mount the sample on a 12 mm plywood panel.
.3 Place a typewritten label under the sample, indicating the network/fluid conveyed.

.3 Manufacturers' instructions
.1 Submit the manufacturer's written recommendations for jointing heat-insulating elements, as well as any indications for special handling, application and cleaning methods.

1.4 QUALITY ASSURANCE

.1 Workforce qualification
.1 The installer must be an expert in the field, have at least three years' proven experience in carrying out work of the type and scope described herein, and possess the required qualifications.

PART 2 - PRODUCTS

2.1 SURFACE COMBUSTION CHARACTERISTICS

.1 According to CAN/ULC-S102.
.1 Flame spread index: maximum 25.
.2 Smoke power index: maximum 50.

.2 All components must carry the ULC mark.

2.2 HEATING MATERIALS - GENERAL INFORMATION

.1 The thermal conductivity coefficient ("k" coefficient) must not exceed the prescribed values at an average temperature of 24 degrees Celsius, as tested in accordance with ASTM C177 and C335, as applicable.

2.3 TYPE D-2 THERMAL INSULATION: FIBREGLASS MAT WITH VAPOUR BARRIER; TEMPERATURE BETWEEN - 40^{O} C AND 65 C^{O}

.1 Description
.1 Flexible 1.5 lb/ft fiberglass mat[3] with FSK membrane.
.2 Thermal insulation in compliance with ASTM C 553.
.3 Vapor barrier in compliance with CGSB 51-GP-52Ma.
.4 Maximum "k" coefficient: 0.035 W/m C.^{o}
.5 Unless otherwise indicated, as described in PART 3 below.

.2 Acceptable products: "Johns Manville" (Schuller), "Manson", "Knauf" or approved equivalent.

2.4 TYPE D-4 THERMAL INSULATION: RIGID FIBREGLASS PANEL WITH VAPOUR BARRIER; TEMPERATURE RANGE -40^{O} C TO 65 C^{O}

.1 Description :
.1 2.25 lb/ft rigid fiberglass panel[3] with FSK membrane
.2 Insulation to ASTM C612 standard
.3 Vapor barrier compliant with CGSB 51-GP-52Ma standard
.4 Maximum "k" coefficient: 0.033 W/m C.^{o}
.5 Unless otherwise indicated, as described in PART 3 below.

.2 Acceptable products: "Johns Manville" (Schuller), "Manson", "Knauf", or approved equivalent.

2.5 SHIRTS

.1 Canvas shirts
.1 ULC-approved, 220 g/m² (0.045 lb/ft^{2}), plain-weave, fire-retardant cotton canvas, coated with diluted heat- and fire-retardant glue in accordance with ASTM C 921.
.2 Heat-insulating adhesive: compatible with heat insulation.
.3 Application: Exposed ducts

2.6 ACCESSORY PRODUCTS

.1 Contact glue :
.1 Fast-setting.
.2 Free of asbestos fibers.
.3 Compatible with thermal insulation.
.4 For bonding insulation boards and mats to pipes and vapour-barrier joints.
.5 Acceptable products: "Henry/Bakor" 230-38 or approved equivalent, with a coverage of 5 m²/L.

.2 Glue and fireproof coating for canvas shirts
.1 Washable.
.2 Free of asbestos fibers.
.3 Compatible with thermal insulation.
.4 Used to bond the scrim liner to the thermal insulation material and protect it thereafter.
.5 Acceptable products: "Henry/Bakor" 120-18 or approved equivalent, with a coverage of 1.25 m²/l.

.3 Exterior vapour-barrier membrane (installed directly on pipes, under thermal insulation)
.1 Self-adhesive thermoplastic vapour-barrier membrane.
.2 1 mm thick
.3 Operating temperature: -40°C to 70°C
.4 Acceptable products: Blueskin SA by "Henry

.4 Ribbon:
.1 Aluminum, self-adhesive, reinforced, at least 75 mm wide.
.2 Acceptable products: MacTac PAF, Venture Tape or approved equivalent.

.5 Tying wire: stainless steel, 1.5 mm (0.06 in.) diameter.

.6 Retaining strips: stainless steel, 0.5 mm (0.02 in.) thick, 19 mm (¾ in.) wide.

.7 Cladding: stainless steel mesh, 1" (25 mm) hexagonal mesh, stapled to both sides of the lagging or to one side of the lagging, the other side covered with expanded metal lath.

.8 Fasteners :
.1 Weld dowels 2 mm (0.08") in diameter and of a length to suit the thickness of the lagging, and retaining plates 35 mm (1.4") in diameter or square.
.2 Acceptable product: BTAP from "Duro-Dyne" or approved equivalent.

PART 3 - EXECUTION

3.1 PREPARATORY WORK

.1 Only install the lagging once the system test has been completed and the results certified by the responsible authority who witnessed the test.

.2 Ensure that surfaces to be lagged or finished are clean, dry and free of foreign matter.

3.2 INSTALLATION

.1 Install lagging in accordance with manufacturers' instructions and drawings.

.2 If the nominal insulation thickness required is greater than 75 mm, or if several thicknesses are required, install in two layers, staggering the joints.

.3 Install lagging and apply finishing plaster seamlessly.
.1 Brackets and hangers must not pierce the vapour barrier.
.2 The lagging and vapour barrier must not be interrupted at protruding sleeves and joints.

.4 For brackets and hangers, please refer to the relevant sections.

.5 Install high-compression lagging where it is likely to be compressed by supports or suspensions due to the weight of the ducts.

.6 Fasteners :
.1 Weld fasteners at 300 mm centres vertically and horizontally, with at least two (2) rows on each wall.
.2 Curl excess pegs.
.3 Tape the heads of all dowels.

.7 Use spacers to keep control devices away from the walls of the air ducts on which they are mounted.

.8 Install 1.0 mm-thick (20-gauge) galvanized sheet metal reinforcements on the lagged corners of all boxes and air ducts located in mechanical equipment rooms and at exposed locations prior to canvas installation.

.9 When the thickness of the insulation required is less than the height of the "T" joint of the duct on which the insulation is installed, the joints must not be visible.
.1 In the case of concealed ducts, each joint is covered with a 150 mm strip of insulation of the same type and thickness as the duct.
.2 In the case of exposed ducts, the duct must be insulated with 50mm of insulation, even if otherwise indicated in the plan, so as to cover the entire joint.

.3 For T-joint dimensions, consult the section on metal air ducts.

3.3 INSULATING AIR DUCTS

.1 On round or oval ducts, apply glue to the entire surface of the duct.

.2 For rectangular ducts, cover 50% of the duct surface with adhesive.

.3 For air intake and outlet boxes, cover 100% of the box surface with adhesive.

3.4 HEAT- AND FIRE-RESISTANT ADHESIVES AND COATINGS

.1 Apply flame-retardant coating to canvas jackets.

.2 Have the fireproof coating approved by the appropriate authorities before applying it. The engineer reserves the right to take a sample of the coating for analysis and testing.

3.5 USAGE - AIR DUCT HEATERS

.1 Refer to the table on the plan.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 American Society of Mechanical Engineers (ASME)
.1 ASME B16.5, Pipe Flanges and Flanged Fittings.
.2 ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.
.3 ASME B16.22, Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings.
.4 ASME B18.2.1, Square and Hex Bolts and Screws Inch Series.

.2 American Society for Testing and Materials International (ASTM)
.1 ASTM A 47/A 47M, Standard Specification for Ferritic Malleable Iron Castings.
.2 ASTM A 53/A 53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
.3 ASTM B 75M, Standard Specification for Seamless Copper Tube Metric.
.4 ASTM B 837, Standard Specification for Seamless Copper Tube for Natural Gas and Liquefied Petroleum (LP) Gas Fuel Distribution Systems.

.3 Canadian Standards Association (CSA)/CSA International
.1 CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures.

.4 Canadian Standards Association (CSA)/Canadian Gas Association (CGA)
.1 CAN/CSA B149.1 HB, Natural Gas and Propane Installation Code Handbook.
.2 CAN/CSA B149.2, Propane Storage and Handling Code.

.5 Health Canada - Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

1.2 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit documents and samples in accordance with general requirements.

.2 Technical datasheets
.1 Submit the required data sheets and manufacturer's specifications and documentation for piping, fittings and equipment.
.2 Identify the items listed in the manufacturer's documentation, i.e.: valves and fittings.

1.3 QUALITY ASSURANCE

.1 When welding piping, refer to section 23 05 17 - Welding piping.

PART 2 - PRODUCTS

2.1 PIPING

.1 Steel pipes: conforming to ASTM A 53/A 53M, series 40, without longitudinal joints and with the following characteristics.
.1 Nominal pipe diameters DN 1/2 to DN 2: screw-in fittings.
.2 Pipes with nominal diameters DN 2 1/2 and larger: bevelled ends for welded joints.

.2 Yellow Jacket" underground piping with yellow rot-proof sheathing.

2.2 JOINTS

.1 Joints on steel piping 2" diameter and under must be screwed with approved jointing compound.
.2 On pipes 2 1/2" diameter and larger, all joints must be butt-welded by a qualified high-pressure welder.
.3 Screwed joints shall comply with ANSI B1.20.1.
.4 Flanged joints should be assembled with 3 mm thick neoprene gaskets. Natural rubber gaskets are prohibited.
.5 Welded joints must be made using a material with a melting point above 525 C.°

2.3 FITTINGS

.1 Steel pipe fittings, screwed, welded or flanged
.1 Malleable iron fittings: screw-in, with bead, class 150 and ANSI B16.3 compliant.
.2 Flanges and flange connections: in carbon steel, class 150, complying with ASME B16.5.
.3 Butt-welding fittings :
    .1 ANSI B16.9 compliant.
    .2 Prefabricated weld-on type.
    .3 Made of carbon steel of the same grade as the pipe on which they are installed.
    .4 Elbows are of the long-radius type.
.4 Union fittings: Class 150 malleable iron, bronze-iron ground, in compliance with ASTM A 47/A 47M (and ANSI B16.3).
.5 Bolts and nuts: in compliance with ASME B18.2.1 (and ANSI B18.2.2).
.6 Nipples: Series 40, in compliance with ASTM A 53/A 53M.

.2 Underground pipe connections must be covered with "Polyken" heat-shrink protective tape.

2.4 ROBINETTERIE

.1 Ball valves
.1 Valve DN 1/2 to DN 2 :
.1 Features: Class 450, category 3.1 MPa type EHG with bronze body, bronze ball, Teflon seat, threaded ends.
.2 Acceptable products: "Neo" fig. 3380, "Red & White", "Crane".

.2 Lubricated ball valves
.1 Valves DN 2 and larger :
.1 Features: class 125, category 860 kPa with cast iron body, flanged ends, with lever.
.2 Acceptable product: "Neo" fig. 4540114, "NewmanMilliken".

2.5 PRESSURE REGULATOR

.1 Diaphragm regulator with screw adjustment at the top.

.2 Materials: stainless steel body.

.3 Acceptable product: Fisher, Rockwell or approved equivalent.

PART 3 - EXECUTION

3.1 PIPING

.1 Install piping, valves and fittings in accordance with relevant provincial/territorial regulations, CAN/CSA B149.1 and the requirements of this section.

.2 When welding piping, install piping in accordance with section 23 05 17 - Welding piping.

.3 No piping should be installed in inaccessible areas.

.4 Provide bleed points at the following locations:
.1 at low points in the network;
.2 at all pipe connections to the equipment.

.5 Identify and paint gas piping in accordance with section 23 05 53.01 - Identification of systems and mechanical appliances. Outside, vents should be painted in a color that matches the building.

.6 Vents
.1 The present contractor shall increase the diameter of the gas vent piping every 15 meters (50 ft.) of piping. The increase in diameter must be made over the entire length of the vent piping.

.2 The diameter of the vent pipe is to be determined by the contractor according to the discharge diameter of the relief valve.
.3 The present contractor must evacuate the vents outside the building, at the location indicated on the plan, or if there is no indication on the plan, he will be responsible for determining a location meeting the standard clearance and submitting it to the owner and professionals for acceptance.

.7 Faucets
.1 Install the emergency shut-off valve in the housing (see details on drawings).
.2 Install the gas shut-off valve supplied by the food service contractor.

3.2 ON-SITE QUALITY CONTROL

.1 Carry out testing and quality control in accordance with the general requirements and the requirements of this section.

.2 On-site testing/inspection
.1 Test the system in accordance with CAN/CSA B149.1 and the requirements of the relevant authorities.
.2 Air pressure tests must last at least 2 hours and pressure loss must be zero. Use air or carbon dioxide.
.3 Test the system at a pressure equal to 1 1/2 times its working pressure, but in no case below the requirements of the applicable codes.
.4 Correct any leaks and retest.

.3 On-site manufacturer services
.1 Arrange for the manufacturer of products supplied under this section to review the work involved in the handling, installation/application, protection and cleaning of his product, and submit written reports, in an acceptable format, verifying that the work is being carried out in accordance with the terms of the contract.
Obtain inspection reports within three (3) days of the site visit, and submit them immediately to the Consultant.

.4 Calibrate gas detection system and provide certificate.

3.3 SETTINGS

.1 Venting: once pressure testing is complete, vent in accordance with CAN/CSA B149.1.

.2 Pre-start-up inspections
.1 Ensure that vent lines to controllers and control/regulating valves are routed to an approved location, are not likely to be obstructed, and are protected from damage.
.2 Check the gas train and ensure that the network is approved by the relevant authorities.

3.4 CLEANING

.1 Purge and start-up the system in accordance with CAN/CSA B149.1.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 23 05 93 - Testing, adjustment and balancing of HVAC systems.

.2 Section 23 05 94 - Pressure testing of ventilation systems.

.3 Section 23 07 13 - Insulation for air ducts.

1.2 REFERENCES

.1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc (ASHRAE).

.2 American Society for Testing and Materials International, (ASTM).
.1 ASTM A 480/A 480M, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
.2 ASTM A 635/A 635M, Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot Rolled.
.3 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.

.3 Department of Justice Canada (Jus).
.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
.1 Material Safety Data Sheets (MSDS).

.5 National Fire Protection Agency Association (NFPA).
.1 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.
.2 NFPA 90B, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
.3 NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

.6 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
.1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2nd Edition and Addendum No. 1.
.2 SMACNA HVAC Air Duct Leakage Test Manual.
.3 IAQ Guideline for Occupied Buildings Under Construction, 1st Edition.

.7 National Air Duct Cleaners Association

.1 Assessment, cleaning and restoration of HVAC systems ACR 2002 (NADCA).

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Supply documents and samples in accordance with general specifications.

.2 Manufacturing drawings for ventilation ducts and mechanical integration drawings must be submitted.

PART 2 - PRODUCTS

2.1 AIRTIGHTNESS CLASSES

.1 The airtightness class of the ducts must be determined according to the table below.

Maximum pressure Pa	Sealing class (SMACNA)
500	C
250	C
125	C
125Unsealed joints	

.2 Sealing classes
.1 Class A: longitudinal joints, transverse joints, wall penetrations and connections sealed with sealant and tape.
.2 Class B: longitudinal joints, transverse joints and connections sealed with sealing tape.
.3 Class C: transverse joints and connections sealed with gaskets. Longitudinal joints not sealed.

.3 Ducts must be designed to withstand a pressure equal to 1½ times the effective static pressure (with a maximum permissible leakage rate of 5%), and a working pressure of less than 500 Pa (2" of water).

2.2 SEALANT

.1 Sealant: for air ducts, polymer-based, flame-retardant, oil-resistant and able to withstand temperatures from -30 degrees Celsius to 93 degrees Celsius.

2.3 SEALING TAPE

.1 Sealing tape: 50 mm wide, loosely woven, polyvinyl-treated glass-fibre membrane.

2.4 AIR DUCT SEALING

.1 In accordance with the requirements set out in SMACNA's HVAC Air Duct Leakage Test Manual.

2.5 FITTINGS

.1 Manufacturing: according to SMACNA.

.2 Rounded-angle bends.
.1 Rectangular ducts: bends with standard radius or as specified; (reduced-radius or square bends with double-thickness baffles) bending radius corresponding to 1.5 x duct width.
.2 Circular ducts :
.1 bends with standard radius or as specified (reduced-radius bend); bending radius 1.5 x conduit diameter.

.3 Branch fittings.
.1 Rectangular main and branch conduits: curved branch on branch, with radius of curvature corresponding to indications, or 45° entry on branch.
.2 Volumetric dampers must be installed in the bypass ducts, close to the main duct connections.
.3 Main bypasses must be fitted with a guide vane.

.4 Transition elements.
.1 Divergent elements: maximum opening angle 20^{o} .
.2 Converging elements: maximum opening angle 30^{o} .

.5 Deviating elements.
.1 Rounded bends as specified.

.6 Obstacle deflectors: to maintain the same cross-sectional area. Maximum opening angles must be the same as for transition elements.

2.6 FIRE PROTECTION

.1 Retaining angles must be fitted around the ducts, on either side of the firewall.

.2 Conduits must not be deformed by the firestop material or its installation.

2.7 GALVANIZED STEEL AIR DUCTS

.1 Deep-drawn steel conduit, G90 galvanized, to ASTM A653 and A924 standards.

.2 Application: anywhere, unless otherwise specified.

.3 Manufacture: shape of conduits and fittings in accordance with SMACNA and ASHRAE recommendations, as well as those of this section, the latter having priority.

.4 Joints : Rectangular pipes with "Pittsburgh" type longitudinal joints (SMACNA -L1) and "T" type transverse- joints. Circular pipes with grooved longitudinal joints (SMACNA RL-5, "Grooved seam") and insertion-type transverse joints.

.5 Unless otherwise indicated, supply ducts and boxes, as well as their accessories, according to the following tables:

.1 Rectangular (or square) ducts

.1 Pipe construction according to English measuring system :

Larger dimension	Sheet gauge (GSG)	Section joints and reinforcements	Suspension	Sealing (Ductmate tape n° 440)
Up to 12"	26	Standing tee 1" to 48" c/c	U-iron 1" x 1/2" x cal 16 to 60" c/c 1/4" Ø rod	All around the joint
from 13" to 30	24	Standing tee 1" to 48" c/c	Angle iron 1.5" x 1.5" x cal 16 to 60" c/c 1/4" Ø rod	All around the joint
from 31" to 54	22	Standing tee 1 3/8" to 48" c/c	Angle iron 1.5" x 1.5" x 1/8" to 60" c/c 1/4" Ø rod	All around the joint
from 55" to 72	20	Standing tee 1 3/8" to 48" c/c Angle iron 1.5" x 1.5" x 1/8" between joints	Angle iron 1.5" x 1.5" x 1/4" to 48" c/c 3/8" rod	All around the joint
from 73" to 96"	18	1 3/8" to 48" c/c standing tee with 3/8" double reinforcing rods 1 1/2" x 1 1/2" x 1/4" angle iron	1.5" x 1.5" x 5/16" angle at 48" c/c 3/8" rod 1.5" x 1.5" x 1/4" angle between joints	All around the joint
97" and over	18	Standing tee 1 1/2" to 48" o.c. with double 3/8" reinforcing rods 2" angle with 3/8" reinforcing rods to 60" o.c. max.	2" x 2" x 5/16" to 48" angle c/c 1/2" rod	All around the joint

.2 Conduit construction according to the SI measurement system :

Larger dimension	Sheet gauge (GSG)	Section joints and reinforcements	Suspension	Sealing (Ductmate tape n° 440)
Up to 300 mm	26	Standing tee 25 to 1200 c/c	U-iron 25 x 12 x cal 16 at 1500 c/c rod 6 Ø	All around the joint
from 301 to 750 mm	24	Standing tee 25 to 1200 c/c	Angle iron 38 x 38 x cal 16 à 1500 c/c rod 6 Ø	All around the joint
from 751 to 1370 mm	22	Standing tee 35 to 1200 c/c	Angle iron 38 x 38 x 3 at 1500 c/c rod 6 Ø	All around the joint
from 1371 to 1825 mm	20	Standing tee 35 to 1200 c/c angle 38 x 38 x 3 between joints	Angle iron 38 x 38 x 6 at 1200 c/c rod 10 Ø	All around the joint
from 1826 to 2400 mm	18	Standing tee 35 to 1200 c/c with double reinforcing rods 10 mm angle 38 x 38 x 6 between joints	Angle iron 38 x 38 x 8 at 1200 c/c rod 10 Ø	All around the joint
2401 mm and over	18	Standing Tee 38 to 1200 c/c with double 10 mm reinforcing rods Angle 50 x 50 x 6 with 10 mm reinforcing rods to 1500 c/c max.	Angle iron 50 x 50 x 8 to 1200 c/c rod 12 Ø	All around the joint

.2 Caisson construction :

Larger dimension	Sheet gauge (GSG)	Reinforcements mm (inches)	Joint height
Up to 1200 mm (48")	20	Angle iron 38 x 38 x 3 (1.5" x 1.5" x 1/8")	35 mm (1 3/8")
1201 to 1800 mm (49" to 71")	18	Angle iron 38 x 38 x 6" (1.5" x 1.5" x 1/4")	35 mm (1 3/8")
1801 to 2450 mm (72" to 96")	18	Angle iron 50 x 50 x 6 (2" x 2" x 1/4")	38 mm (1 1/2")

.3 Plenums

Note: Boxes to be integrated into air handling units are specified in section 23 73 10.

.4 Circular duct construction

Diameter of conduit mm (inches)	Longitudinal joints stapled (GSG gauge)	With spiral wound seals (GSG caliber)	Suspension	
			Rods mm (inches)	Supports (rings) mm (inches)
75 à 350 (3" à 14")	24	26	6 dia. at 3000 c/c (1/4" dia. to 120" c/c)	25 x 1,6 (1" x 1/16")
351 à 650 (15" à 26")	22	24	9 dia. at 3000 c/c (3/8" dia. to 120" c/c)	38 x 3 (1 1/2" x 1/8")
651 à 900 (27" à 36")	20	22	9 dia. at 3000 c/c (3/8" dia. to 120" c/c)	38 x 3 (1 1/2" x 1/8")
901 à 1200 (37" à 48")	18	20	11 dia. at 2400 c/c (7/16" dia. to 96" c/c)	50 x 4,7 (2" x 3/16")

2.8 SUPPORTS AND SUSPENSIONS

.1 Angle irons and suspension rods: galvanized steel angle irons held in place by galvanized steel threaded rods c/a nuts and locknuts, as shown in the table below:

Conduit diameter (mm)	Dim. angles (mm)	Diam. rods (mm)
up to 75	25 x 25 x	3 6
from 751 to 1050	40 x 40 x	3 6
from 1051 to 1500	40 x 40 x	3 10
from 1501 to 2100	50 x 50 x	3 10
from 2101 to 2400	50 x 50 x	5 10
2401 and over	50 x 50 x	6 10

2.9 DIELECTRIC SEALS

.1 Install dielectric seals where aluminum conduits connect to galvanized steel or stainless steel conduits.

2.10 CLEANLINESS OF AIR DUCTS

.1 The contractor must take the necessary steps to keep air ducts clean during work.

2.11 THERMAL INSULATION AND SOUNDPROOFING COATING

.1 Thermal insulation on ducts is described in section 23 07 13, and soundproofing in section 23 33 53.

PART 3 EXECUTION

3.1 GENERA L

.1 Carry out work in accordance with the requirements of the relevant SMACNA standards.

.2 Avoid interrupting the continuity of the lagging's vapour-barrier membrane when installing straps or suspension rods.
.1 Extend the lagging of the insulated ducts over the suspension straps, to a height of 100 mm. Make sure the diffusers are securely in place.

.3 Secure vertical conduits in accordance with the requirements of the relevant SMACNA standards.

.4 Provide weakened joints on both sides of firewalls.

.5 Install proprietary prefabricated flange gaskets according to the manufacturer's instructions.

.6 Manufacture conduits to lengths and diameters that facilitate installation of the acoustic lining.

3.2 CLEANLINESS MEASURE

.1 Completely clean, wash and degrease the inside of all conduits, ducts and accessories in the system's ductwork in the workshop before sending them to the worksite.

.2 Clean the inside of all other conduits, ducts and accessories in the workshop before sending them to the site.

.3 Install sealing membranes on all ventilation and air-conditioning ducts and accessories before sending them to the job site. The sealing membranes will only be removed one at a time during installation of each duct section. During duct installation, the seal at each end of the duct will be left in place by the contractor until the next joint is made.

.4 Prior to start-up, samples will be taken at the owner's expense to verify the cleanliness of the ventilation systems. However, if any deficiencies are found, the ventilation contractor will be responsible for correcting them by having the defective components, equipment or duct sections cleaned by a NADCA-approved cleaning contractor.

3.3 AIR DUCT INSTALLATION

.1 Manufacture all metal ducts and boxes with diagonal folds to ensure greater rigidity.

.2 Conceal all conduits inside ceiling spaces. In rooms without suspended ceilings, suspend conduits directly below structural elements (unless otherwise indicated on the plans), leaving a 10 mm (3/8") clearance. In mechanical rooms with ceilings, install equipment below the ceiling.

.3 Use flat tinned copper braid size (n°6) with bolt-on lugs to ensure continuity of grounding throughout flexible air-duct connections.

.4 Install balancing dampers in all connections as indicated.

.5 All bends must be radiused, unless otherwise shown on the drawings.

.6 The radius of elbows shall not be less than one and a half times the diameter or width of the duct to which it is connected. Where a square elbow is shown on the plans, this section shall include hollow, profiled (double-walled) "Duct-Turn" type guide vanes on the inside; full-radius guide vanes shall be installed on some elbows, as shown on the plans. Elbows for circular ducts will be manufactured in 3

sections for ducts up to 250 mm (10") in diameter, and in 5 sections for ducts over 250 mm (10") in diameter.

.7 The four (4) sides of the vertical conduits that will pass through the floors will be supported at each level on rigid angles attached to the building structure.

.8 At least 25 mm (1") of space must be left between the walls of the ducts and the pipes, partitions, etc., near which the ducts pass. In partitions, floors and walls where fire resistance is not required, this space will be filled with insulating wool, tightly compressed in place. In soundproofed walls, a cavity 25 mm (1") deep should be left on each side of the opening; this cavity should then be filled with a sealant (acceptable product: Tremco Dymeric or equivalent). A caulking joint is then made between the duct and the exterior and interior surfaces of the wall, partition or floor. In fire-retardant partitions, floors and walls, consult the installation details for the fire dampers shown on the plans.

.9 All branches for square and rectangular ducts will be radiused with integrated transformations, manufactured in one piece unless otherwise indicated on the plans. No 90-degree branches, no plenum bends, no "Sabot" (boot) type branches will be accepted, except for the exception indicated in the following article. All branches on circular conduits must be made with 45-degree conical fittings.

.10 Sabot" type branches will be accepted on the master conduit at the outlet of a limit switch box, when the following conditions are met:
.1 the length of the shoe will be 150 mm (6");
.2 the air inlet side of the shoe will be at 45 ;
.3 the height of the shoe must be the same as that of the downstream pipe;
.4 a manual balancing damper will be installed just after the sabot.

.11 Conduit fabrication and installation drawings must be submitted to the engineer for verification before fabrication begins.

.12 All duct and box dimensions specified are free inside dimensions, inside the lagging or soundproofing, if applicable.

.13 Transverse joints for circular and oval ducts (except welded joint systems) should be male-female with a 75 mm (3") insertion length. They will be held in place with metal screws (minimum 3) and then covered with a coat of sealant; also cover all longitudinal joints of the conduits with sealant and install the conduits so that the joints are on top of the conduits.

.14 Manufacture circular and oval conduit accessories with welded joints. All welded joints will be coated with an

anti-corrosion paint such as "Galvicon". Manufacture any special accessories required.

.15 Duct runs and dimensions may be changed to accommodate various building obstructions, but only after obtaining the engineer's approval to maintain an equivalent pressure drop.

.16 Install fiberglass air ducts according to manufacturer's recommendations and SMACNA standards.

.17 Perforated steel strip supports, as well as supports made from "S" joints and sheet metal edges, are prohibited. All supports such as U-irons, angles and rings must be made of the same material as the conduits they support. All accessories, such as elbows, corners, etc., must be made of sheet metal two gauges stronger than the conduit of the same size.

3.4 WATERTIGHT DUCTS

.1 Where welding is specified in part 2 of this clause, continuously weld all longitudinal and transverse joints of ducts and boxes, making them watertight and airtight.

.2 In addition, the air ducts and boxes listed below (galvanized steel, aluminum, etc., depending on the system) will be made watertight by applying Duro-Dyne "S-2" sealant (or approved equivalent) from the inside:

.1 All gaskets on fresh air intake and stale air outlet boxes.

.2 All drip pans; each drain shown in the plan will have a drip pan with a minimum depth of 75 mm (3"), unless this pan is already integrated into some other equipment (e.g. under-cabinet fan).

.3 Ducts for systems with humidifiers, from the drip tray of the humidifier's steam distributor to 3 meters (10'-0") downstream and 1 meter (3'-0") upstream.

.4 All P.A.N. and S.A.V. ducts (transverse and longitudinal joints in their entirety) from the louver to the system mix or coil, as the case may be.

.5 Dryer exhaust duct.

.6 Domestic kitchen hood exhaust duct.

.3 Incline welded pipes towards drains. Prevent water from accumulating in the lower part of the pipe.

.4 All transverse joints of all other square or rectangular ducts ("T" joints) are required with a continuous 4-sided gasket (Ductmate tape nº 440 or approved equivalent). In addition, each side of the joints will be fitted with metal screws 50 mm (2") from the corners and other screws every 200 mm (8") o.c. Once the conduits have been joined, add sealant to the corners to ensure a perfect seal.

.5 All transverse joints of all other circular ducts (male-female joints) will be sealed with adhesive and fiberglass tape. The sealant will be a polymer-based, fire-retardant "Foster 30-02"

or "Duro-Dyne S-2" adhesive. Tape shall be "Duro-Dyne FT-2", 50 mm (2") wide or approved equivalent. The male-female joint will be held in place by metal screws (minimum 3), then covered with a coat of sealant, a woven fiberglass membrane and a final coat of sealant. All these operations should be carried out in accordance with the manufacturer's instructions. Allow a drying period of 2 days to allow the joints to harden, before beginning tests (when required) on the ducts.

.6 Install airtight access doors where shown on the plans and specified in the section on air duct accessories.

3.5 SEALING

.1 Apply sealant to the outside of the joints, in accordance with the manufacturer's recommendations.

.2 Embed the tape in the sealant, then cover with at least one coat of the same sealant, according to the manufacturer's recommendations.

3.6 AIR DUCT LEAKAGE TESTING

.1 When required in this specification, refer to section 23 05 94 - Pressure testing of air systems.

The absence of section 23 05 94 does not release the contractor from his obligation to ensure that the ductwork meets the required class. If in doubt, the engineer may require testing at no extra charge.

.2 Leakage tests are not required during the construction of low-pressure air duct systems. However, if one or more systems fail to perform as expected after installation, the Engineer may require leakage tests on these systems, which shall be carried out by this section according to the instructions given by the Engineer at the time.

.3 Leak tests for low-pressure ducts, when required, must be carried out at a pressure of 500 Pa (2" of water).

.4 Ducts must not leak audibly in a quiet environment. Leakage must not exceed 3% of the design airflow, depending on the length of the section tested.

.5 Perform leakage tests in accordance with the requirements set out in SMACNA's HVAC Duct Leakage Test Manual.

.6 Test by section.

.7 Perform preliminary leakage tests (to detect air leaks) as instructed, to check workmanship.

.8 Do not install any further conduits until the results of these preliminary tests are satisfactory.

.9 Test sections must be at least 30 m long, with at least three branches and two 90-degree bends.

.10 Do not lag or conceal conduits until required tests have been completed.

3.7 AIR FLOWS

.1 Air flow balancing work will be carried out by section 23 05 93.

.2 The contractor of this section must, however, directly assist the balancing contractor during his mandate by making, at his own expense, any modifications required to the systems to obtain the specified performance, including, if required, fan pulleys and belts, and damper positions. He will also add any balancing dampers and accessories required.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 23 05 29 - Supports and hangers for HVAC piping and equipment.

.2 Section 23 05 94 - Pressure testing of ventilation systems.

1.2 REFERENCES

.1 Unless otherwise specified, perform all work in accordance with the current edition of the "Quebec Construction Code".

.2 In addition, perform the work in accordance with any other code or standard having jurisdiction, according to the edition in force, including but not limited to:

.1 American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE).

.1 ASHRAE Handbook, Fundamentals and Systems Volumes.

.2 American Society for Testing and Materials International (ASTM).

.1 ASTM A480/A480M, Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.

.2 ASTM A525, Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanised) by the Hot-Dip Process (Metric).

.3 ASTM A621/621M, Specification for Steel Sheet and Strip, Carbon, Hot Rolled, Drawing Quality.

.4 ASTM A653/A653M, Standard Specification for Steel Sheet, ZincCoated -(Galvanized) or ZincIron -Alloy Coated (Galvannealed) by the HotDip -Process (Metric).

.3 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA).

.2 Transportation of Dangerous Goods Act (TDGA).

.4 National Air Duct Cleaners Association (NADCA).

.1 Assessment, Cleaning and Restoration of HVAC Systems (ACR 2005).

.5 National Fire Protection Agency Association (NFPA).

.1 NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems.

.2 NFPA 90B, Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

.3 NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.7 Sheet Metal Air-Conditioning Contractors' National Association (SMACNA).
.1 SMACNA, HVAC Duct Construction Standards, Metal and Flexible.
.2 SMACNA, HVAC Air Duct Leakage Test Manual.
.3 SMACNA, IAQ Guideline for Occupied Buildings under Construction.

.8 Underwriters Laboratories of Canada (ULC).

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Provide the documents and samples required in accordance with the general specifications.

.2 Manufacturing drawings for ventilation ducts and mechanical integration drawings must be submitted.

1.4 QUALITY ASSURANCE

.1 Workforce qualification
.1 The installer must be an expert in the field, have at least three years' proven experience in carrying out work of the type and scope described herein, and possess the required qualifications.

1.5 TRANSPORT, STORAGE AND HANDLING

.1 Storage and protection
.1 Protect materials and equipment from the elements and from damage caused by the movement of people, equipment and vehicles.
.2 Protect materials and equipment from damage.

.2 Store materials and equipment at temperatures and under conditions specified by the manufacturer.

1.6 RELIABLE TECHNICAL DATA

.1 Data taken from manufacturers' catalogs and documentation must be reliable data, confirmed by tests carried out by the manufacturers themselves or, on their behalf, by independent laboratories, and certifying the conformity of the components to the requirements of the codes and standards in force.

1.7 CLEANLINESS OF AIR DUCTS

.1 Air ducts must be clean at start-up. The amount of dust on the surface of the air ducts must be less than 0.75 mg/100 cm^2 , according to the NADCA Vacuum Test.

.2 If the cleanliness of the air ducts does not meet the criteria of 0.75 mg/100 cm^2 , the Contractor must have all ducts cleaned in accordance with the "Assessment, Cleaning and Restoration of HVAC Systems (ACR 2005)" guide.

1.8 AIR DUCT DESIGN PRESSURE

.1 System no.: 1-VE-1
.1 Evacuation: 350 Pa (maximum pressure).

PART 2 - PRODUCTS

2.1 AIR DUCTS AND FITTINGS

.1 Round or oval conduits in galvanized steel with Z90 zinc coating, spiral type, to ASTM -A525M80-.

.2 Application: where indicated.

.3 Fabrication: the shape and configuration of conduits and fittings must comply with SMACNA and ASHRAE recommendations. However, the specifications in this section take precedence.

.4 Joints: ducts joined together with 150 mm (6") male spigot sleeves; accessories (elbows, tees, etc.) fitted with male spigots with 75 mm (3") insertion length for connection to ducts. Use "Foster 30-02" or "Duro-Dyne -S2" oil-resistant, polymer-based, flame-retardant, high-flow-rate air duct adhesive. -Use 50 mm (2") wide polyvinyl-coated loose-weave fiberglass tape, Duro-Dyne type FT-2 or approved equivalent.

.5 The wall thickness of the ducts must never be less than the following:

Round pipe diameter mm (inches)	Major axes of the oval ducts mm (inches)	Sheet metal gauge (GSG)
Up to 350 (14)	---	24

351 à 600 (15 à 24)	Up to 600 (24)	22
601 à 900 (25 à 36)	601 à 1200 (25 à 48)	20
901 à 1200 (37 à 48)	1201 à 1800 (49 à 60)	20
1201 à 1500 (49 à 60)	1801 (61) and more	18
1501 (61) and more	---	16

.6 Accessories such as elbows, angles, etc., made of sheet metal two gauges stronger than the same size conduit; all joints making up the accessories must be fully welded (continuous).

.7 Acceptable materials: Spiro Métal Tube or approved equivalent.

.8 For oval and spiral ducts, when the smallest duct dimension is greater than 600 mm (24"), substitute an oval duct with longitudinal joint. However, reinforce the latter with 10 mm (3/8") diameter galvanized steel rods welded (over the height) every 1200 mm (48") c/c, with welds protected by "Galvicon" coating or approved equivalent.

2.2 THERMAL INSULATION

.1 Thermal insulation for air ducts is described in section 23 33 53.

2.3 AIRTIGHTNESS CLASSES

.1 Class A: longitudinal joints, transverse joints, wall penetrations and connections sealed with sealant and tape.

2.4 SEALANT

.1 For operating temperatures above -7°C (19.4°F) :
.1 ULC-approved, water-based, air duct sealant with a flame spread rating of up to 25 and a smoke development rating of up to 50, for use in an operating temperature range from -7°C (19.4°F) to 93°C (200°F).
.1 Acceptable products: Duro Dyne DWN.

.2 For operating temperatures less than or equal to -7°C (19.4°F) :
.1 Polymer-based, flame-retardant, oil-resistant air duct sealant for temperatures from -30°C (22°F) to 93°C (200°F).

.1 Acceptable products: Duro Dyne S-2; Foster 30-02; 3M, EC-800.

.3 Sealing tape: 50 mm wide, polyvinyl-treated, loosely woven fiberglass tape.
.1 Acceptable products: Duro Dyne FT-2.

.4 Gasket :
.1 Acceptable products: Ductmate.

2.5 AIR DUCT INSTALLATION

.1 Install steel conduit in accordance with SMACNA standards.

.2 Use a flat copper braid, size no. 2/0, to ensure grounding continuity throughout the flexible air-duct connections.

.3 Anchor all vertical conduits every two metres (6'-6") maximum, using brackets and angle irons attached to the building structure.

.4 Suspend ducts using steel hangers held in place by rods fitted with nuts and lock washers. Select suspension elements according to the table below-:

Duct diameter or major axis mm (inches)	Stirrup dimensions mm (inches)	Suspension rod diameter mm (inches)
Up to 1050 (42)	50 x 4,7 (2 x 3/16)	10 (3/8)
1051 à 1500 (43 à 59)	50 x 6,4 (2 x 1/4)	13 (1/2)
1501 à 2100 (60 à 83)	75 x 7,9 (3 x 5/16)	13 (1/2)
2101 à 2400 (84 à 95)	75 x 7,9 (3 x 5/16)	16 (5/8)
2401 (96) and more	75 x 7,9 (3 x 5/16)	16 (5/8)

.5 Space the stirrups every 2.45 m (8'-0") center to center.

.6 The radius of elbows must not be less than twice the diameter of the pipe to which they are connected.

.7 At least 25 mm (1") of space must be left between the walls of the ducts and the pipes, partitions, etc., near which the ducts pass. In partitions, floors and walls, where fire resistance is not required, this space will be filled with insulating wool strongly compressed in place. In soundproofed walls, a cavity 25 mm (1") deep should be left on each side of the opening;

this cavity should then be filled with a sealant (acceptable product: Tremco Dymeric or equivalent). A caulking joint is then made between the duct and the exterior and interior surfaces of the wall, partition or floor. In fire-retardant partitions, floors and walls, consult the installation details for the fire dampers shown on the plans.

.8 All branches will be tapered to 45° with integrated transformations. No 90° branches will be accepted.

.9 A duct installation drawing must be submitted to the engineer before installation begins.

.10 All duct dimensions specified on the drawings and/or specifications are free inside dimensions.

.11 Conduit should be assembled in such a way that all joints are either metallized with sheet metal screws or everdur welded. Joints metallized with screws shall be sealed as follows:

Metalize the joint using sheet metal screws (minimum 3 screws per joint). Apply a layer of adhesive to the joint, and wrap several layers of fiberglass tape around it. Over this tape, finish with a final layer of adhesive, or more if necessary, to achieve a tight seal.

PART 3 - EXECUTION

3.1 GENERAL

.1 Carry out work in accordance with ASHRAE and SMACNA requirements and as specified.

.2 Avoid interrupting the -lagging's vapour-barrier membrane -when installing straps or suspension rods. Extend the lagging on the suspension straps 100 mm -beyond the lagged pipe.

.3 Secure vertical ducts in accordance with ASHRAE and SMACNA requirements, and as indicated.

.4 Make weakened joints around the conduit, on either side of the fire separation.
.1 Round pipes: interlocking joints.
.2 Rectangular ducts: proprietary prefabricated flanged joints.

3.2 SEALING

.1 Apply sealants in accordance with the manufacturer's and SMACNA's recommendations.

.2 Embed the tape in the sealant, then cover the whole with at least 1 coat of the same sealant, according to the manufacturer's recommendations.

.3 Seal all openings in the air ducts, such as openings for instrumentation, damper linkages, coils, etc., with a neoprene or silicone sealant or gasket, while allowing normal movement of equipment installed in the ducts.

3.3 TEST PORTS AND MEASURING INSTRUMENTS

.1 At the inlet and outlet of each ventilation system, and at the inlet and outlet of silencers, install 25 mm (1") plugs with chain and cap to seal the insertion holes for testing and balancing instruments. Duro-Dyne" model IP-1 plugs or approved equivalent.

3.4 DUCT LEAKAGE TESTING

.1 Carry out an initial leak test, as instructed, to check the quality of workmanship.

.2 Don't install any further ducts until the first test has been successful.

.3 Leak tests must be carried out at a positive pressure of 1500 Pa (0.2 PSI) for supply lines, and at a negative pressure of 750 Pa (0.1 PSI) for return and exhaust lines.

.4 Ducts must be free from audible leakage in a quiet environment. Leakage must not exceed -11/2% of the calculated flow, taking into account the length of the section of duct tested.

3.5 AIR FLOW BALANCING

.1 Air flow balancing work will be carried out by section 23 05 93.

.2 The contractor of this section must, however, directly assist the balancing contractor during his mandate by making, at his own expense, any modifications required to the systems to obtain the specified performance. He must also add any balancing dampers and accessories required.

3.6 COMBUSTION PRODUCT DETECTORS

.1 When combustion product detectors are provided in ventilation systems, they are supplied and connected by Division 16, but must be installed in the ducts by this section.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
- .1 Material Safety Data Sheets (MSDS).

.2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
- .1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

1.2 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Supply documents and samples in accordance with general specifications.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Fittings must be manufactured in accordance with SMACNA's HVAC Duct Construction Standards.

2.2 FLEXIBLE SLEEVES

.1 Metal end elements
- .1 Elements in 24 ga galvanized sheet metal, to which the flexible sleeve is bonded by means of double-stapled joints.
- .2 Acceptable products: Duro- Dyne Metal Fab or approved equivalent.

.2 Flexible cuff
- .1 Indoor application
  - .1 Factory-made, neoprene-coated, flame-retardant, self-extinguishing glass fabric for temperatures from -40 degrees Celsius to 90 degrees Celsius, density 1.02 kg/m².
  - .2 Acceptable products: Duro- Dyne Neoprene or approved equivalent.
- .2 Outdoor application
  - .1 Hypalon-coated glass fabric, flame-retardant, self-extinguishing, factory-made, able to withstand temperatures between -40 degrees Celsius and 120 degrees Celsius, with a density of 0.81 kg/m².
  - .2 Acceptable products: Duro- Dyne Durolon or approved equivalent.

2.3 ACCESS DOORS

.1 Non-insulated ducts: double-walled doors (sandwich construction), made of the same material as the ducts, but with the next greater thickness, which must not be less than 0.6 mm, with a metal angle frame.

.2 Insulated ducts: double-walled doors (sandwich construction), made from the same material as the ducts, but with the next greater thickness, which must not, however, be less than 0.6 mm, with a metal angle frame and 25 mm thick rigid glass-fibre insulation.

.3 Seals: neoprene

.4 Hardware parts
.1 Doors up to 300 mm square: two frame latches, with safety chain.
.2 Doors from 301 mm to 450 mm square: four frame latches, with safety chain.
.3 Doors between 451 mm and 1000 mm square: one piano hinge and at least two frame latches.
.4 Doors over 1000 mm square: one piano hinge and two handles, operable from inside and outside.
.5 Hold-open devices.

.5 Acceptable products: "Duro-Dyne, Ductmate Industries, Controlled Air MFG, Nailor Industries".

2.4 DEFLECTORS

.1 Aerodynamically shaped, double-thickness deflectors with small or large radius of curvature (as specified), factory- or workshop-manufactured to SMACNA recommendations and specifications.

.2 Elbows with a width of 300 mm (12") or less will be fitted with 57 mm (2.25") wide vanes. Elbows wider than 300 mm (12") will be fitted with 114 mm (4.5") wide vanes.

.3 Acceptable products: "DuroDyne-, Tuttle and Bailey".

2.5 ADJUSTABLE AIR DEFLECTORS

.1 Adjustable air deflectors for the air mixtures specified in the plans shall be supplied and installed by this section.

.2 Adjustable air deflectors should be made of 1.6 mm-thick galvanized sheet steel (16 GSG). For ducts exceeding 230 mm (9"), air deflectors shall be reinforced with galvanized steel angle irons encircling the air deflector and forming sections up to 1500 mm (60") c/c wide.

.3 The deflectors shall pivot on a continuous piano hinge along the entire length of the deflector. A minimum of two (2) locking

control rods shall be used to adjust the angle of the deflector. For deflectors exceeding 1500 mm in width, a control rod with locking device is required every 1200 mm (48") c/c maximum.

2.6 BOSSES AND FITTINGS FOR TEST INSTRUMENTS

.1 Elements in 1.6 mm steel, galvanized after manufacture.

.2 Elements consisting of a cam lever with chain and a neoprene expansion pad.

.3 Inner diameter at least 28 mm; length to suit insulation thickness.

.4 Neoprene mounting fittings.

2.7 CORDED SPOILER COUPLINGS

.1 Conical fittings in galvanized sheet metal with lockable shutter.

.2 The thickness of the sheet metal must be consistent with that of round conduits.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Flexible sleeves
.1 For installation in the following locations:
.1 inlet and outlet sides of air discharge elements and fans;
.2 inlet and outlet sides of air extraction and return fans;
.3 where indicated.
.2 Maximum length of flexible sleeves: 150 mm.
.3 Minimum distance between end metal elements when the system is in operation: [75] mm.
.4 Install flexible sleeves in accordance with SMACNA recommendations.
.5 When the system is operating,
.1 the metal elements at each end of the flexible sleeve must be properly aligned;
.2 the cuff must have little slack: it must be fitted with just enough slack to prevent vibrations from being transmitted.
.3 the sleeve must allow a movement of 100 mm (4") for high-pressure fans, and 50 mm (2") for low-pressure fans.
.6 Ensure continuity of the conduit network grounding using nº 2/0 copper braided conductors connecting the metal parts on either side of the flexible conduits.

.2 Access doors and portholes
.1 Dimensions
.1 300 mm x 150 mm for an inspection door.
.2 As indicated.
.2 Location
.1 Where required to provide access to smoke dampers and fire dampers.
.2 Where required to allow access to airflow adjustment dampers.
.3 Where required to allow access to devices requiring periodic maintenance.
.4 Where required, as per code requirements.
.5 Where required to allow access to the reheating batteries.
.6 At other indicated locations.
.7 Ductwork must be fitted with doors to allow access to maintenance and inspection equipment, as well as to drain connections required for special installations.
.8 In general, equipment requiring access hatches includes: coils, filters, humidifiers, controls, combustion product detectors, fire dampers, heaters, motorized dampers, drip pans, etc.
.9 Access doors for equipment and enclosures in mechanical rooms should be the same height as the equipment or enclosure in question and at least 600 mm (24") wide, where possible. They should be hinged, equipped with locks and insulated.
.10 Access doors on ducts should be 460 mm X 350 mm (18" x 14"), insulated where ducts are insulated, and secured by clamping spring-loaded handles.
.11 These inspection doors must be watertight and allow easy access to the equipment served.
.3 Bosses and fittings for test instruments
.1 General
.1 Install components in accordance with SMACNA recommendations and manufacturer's instructions.
.2 Arrange them to facilitate instrument handling.
.3 Install lagging penetrations as required.
.4 Location
.1 Air flow measurement
.1 Inlet side of wall-mounted or roof-mounted exhaust fans.
.2 Inlet and outlet sides of other fans.
.3 On main conduits and main branches.
.4 Where indicated.
.2 Temperature measurement
.1 On fresh air intakes.
.2 On the air mixing boxes, where indicated by the Consultant.
.3 At the inlet and outlet of air heating/cooling coils.

.4 Downstream of any point where two converging air streams of different temperatures meet.

.5 Where indicated.

.4 Deflectors

.1 Install deflectors in accordance with SMACNA recommendations and indications.

.2 All square pipe bends must be fitted with guide vanes.

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Sheet Metal and Air Conditioning National Association (SMACNA)
.1 SMACNA, HVAC Duct Construction Standards, Metal and Flexible.

1.2 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Supply documents and samples in accordance with general specifications.

PART 2 - PRODUCTS

2.1 GENERAL

.1 Registers must be manufactured in accordance with the relevant SMACNA standards.

2.2 BALANCING DAMPERS

.1 Air distribution dampers
.1 Registers made of the same material as the air duct, but in sheet metal 2 gauges thicker than the air duct.
.2 Registers made of 2 layers of sheet metal.
.3 Damper dimensions and configuration must comply with SMACNA recommendations.
.4 Registers fitted with a control rod with locking device.
.5 The curvature at the end of the rod should prevent this end from entering the air duct.
.6 Pivot: Piano hinge.

.2 Single-panel registers
.1 Dampers made from the same material as the air duct and grooved for greater rigidity.
.2 Damper dimensions and configuration must comply with SMACNA recommendations, except for the maximum height, which is 300 mm (12").
.3 Registers equipped with a locking sector.
.4 Registers with bearings at inner and outer corners.

.3 Multiple-flap registers
.1 Factory-made dampers made of a material compatible with that of the air duct.
.2 Opposite shutters: configuration in accordance with SMACNA recommendations.
.3 Maximum shutter height: 100 mm (4").

.4 Bearings: needle roller bearings in bronze bushings.
.5 Control linkage: shaft extension with locking sector.
.6 Angle frame with corner stop.

.4 Deflectors
.1 Adjustable, curved-blade dampers mounted in a support frame.
.2 All-aluminium deflectors.

.5 Acceptable products: "Tuttle and Bailey, Titus, E.H. Price, Anemostat".

2.3 SINGLE-PANE REGISTERS

.1 Flap dampers made from the same material as the air duct, but with a standard thickness immediately greater than that of the air duct, with a V-groove for greater rigidity.

.2 Shape and dimensions in accordance with SMACNA recommendations, except for maximum height, which must be 100 mm as specified.

.3 Extendable locking sector to suit the thickness of the air duct lagging.

.4 Inner and outer nylon end bearings.

.5 Profile frame made of the same material as the air duct in which the damper is mounted, with corner stops.

.6 Flap dampers made from the same material as the air duct, but with a standard thickness immediately greater than that of the air duct, with a V-groove for greater rigidity.

.7 The shape and dimensions of the registers comply with SMACNA recommendations, except for the maximum height, which must be 300 mm.

.8 Extendable locking sector to suit the thickness of the air duct lagging.

.9 Inner and outer nylon end bearings.

.10 Profile frame made of the same material as the air duct in which the damper is mounted, with corner stops.

2.4 MULTI-BLADE DAMPERS

.1 Factory-made dampers made of a material compatible with that of the air duct.

.2 Opposed blades: configuration in accordance with SMACNA recommendations.

.3 Maximum blade height: 100 mm (4").

.4 Bearings: needle roller bearings in bronze bushings.

.5 Control linkage: shaft extension with locking sector.

.6 Profile frame made of the same material as the adjacent air duct, with corner stops.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install dampers in accordance with SMACNA recommendations and manufacturer's instructions.

.2 Install balancing dampers at all locations required for air flow balancing, and where indicated.

.3 Install multi-blade dampers of the opposed blade type in secondary branches whose height exceeds 250 mm (10 in.), and in all main branches.

.4 Install single-blade dampers in secondary branches leading to a grille or diffuser, not exceeding 250 mm (10 in.) in height.

.5 Position the dampers to be installed in the connections as close as possible to the main duct.

.6 Install controls where they are easily visible and accessible.

.7 Secure dampers, including pivot and control rod, to prevent vibration.

.8 Install air-distribution dampers in culotte-shaped ducts only.

.9 In the case of fire-rated ceilings, hang the elements from the building structure, not from the ceiling grid (suspended). Once installation is complete, check that the ceiling's NFPA and ULC fire-resistance rating is fully complied with.

3.2 ON-SITE QUALITY CONTROL

.1 Tests

.1 The tests must be carried out over a period of at least 7 days, and must demonstrate that the system is operating as specified.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Division 25 - Automatic control.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)
.1 ASTM A 653/A 653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Supply documents and samples in accordance with general specifications.

PART 2 - PRODUCTS

2.1 MOTORIZED REGISTERS

.1 All motorized dampers will be supplied and installed by this section; actuators supplied and installed by Division 25.

.2 For a modular system, the recirculation damper will be supplied and integrated into the mixing box by section 23 73 10. The damper actuator, however, will be supplied by division 25.

.3 Construction
.1 Parallel blades (unless otherwise specified) up to 150 mm (6") wide, each blade can be made up to 1525 mm (60") long in a single piece.
.2 Maximum modular dimensions 1525 mm (60") wide by 1220 mm (48") high.
.3 For multi-section dampers, use reinforcing crosspieces and return pins.
.4 When insulated, slats with cavities insulated with polyurethane foam (R6.6) and frame insulated on 4 sides with polystyrene foam (R5.0).

.4 Materials for rectangular registers
.1 Frame: 2.0 mm thick (12-gauge) profiled aluminium.
.2 Blades: profiled aluminum, 2.0 mm thick (12-gauge).
.3 Bearings: plastic "Celcon" and "Merlon Polycarbonate". Supply additional thrust bearings for vertical blades.
.4 Aluminum rods and hexagonal crank arms for pneumatic or electric actuators as required.
.5 Seals: replaceable rubber seals (4 slats) on frame sides and replaceable rubber seals along all seals, at blade edges and an angled stop at the bottom and top of the profiled aluminum frame.
.6 Frames shall be of 2.0 mm (12-gauge) or heavier profiled aluminum, bent for maximum rigidity and provided with flanged mounting holes in the ductwork. Blades on all multi-blade dampers will be no more than 150 mm (6") wide. These blades will be attached to 12 mm (1/2") diameter shafts by means of chamfers running longitudinally through these shafts.
.7 All steel parts are cadmium-plated.

.5 Materials for round registers
.1 Construction identical to that of rectangular dampers, with a 1.3 mm thick galvanized steel transition piece (18 gauge) installed on each side of the damper.

.6 Materials for stainless steel round dampers
.1 Frame: 50 mm (2") wide x 3.2 mm (1/8") thick 316 L stainless steel frame.
.2 Blade: single 316 L stainless steel blade, 1.6 mm thick (16 gauge).
.3 13 mm (1/2") diameter stainless steel rods, pneumatic or electric actuator. Bronze or nylon sleeves.
.4 Stainless steel stop frames and hardware.
.5 Neoprene seals.
.6 Frames are provided with holes for flange mounting.

.7 Performance
.1 Maximum permissible leakage: 7 m^3 /min./m^2 (25 cfm/ft^2) at a static pressure of 1.25 kPa (5" water); high-sealing type.
.2 Temperature range -40° C to 93° C.

.8 Acceptable products
.1 Rectangular registers :
.1 Insulated conduits: "Tamco" 9000-BF series, flanged type.
.2 All other applications: "Tamco" 1000 series flange type.
.2 Round stainless steel registers: "Trolec" model V-90-R-55.
.3 Quality required: "Tamco, Trolec, Ventex".

.9 Specific description
.1 Motorized dampers are shown on the plans and their net inside dimensions are the same as those of the ducts to which they are connected.

2.2 BACKFLOW PREVENTERS

.1 Automatic gravity-operated, single- or multi-blade aluminum (or stainless steel) dampers with adjustable counterweight.

.2 2.3 mm (0.09") thick extruded aluminum frame.

.3 Extruded aluminum blades, 1.2 mm (0.05 in.) thick, with vinyl trim for a tight seal.

.4 Bearings: synthetic bearings.

.5 Connecting flanges: dampers of the type to be inserted into ducts are not acceptable.

.6 Acceptable products: Ruskin CBD2.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Once the work is complete, have it accepted before concealing it.

.2 Install backflow dampers where indicated, as recommended by SMACNA and the manufacturer.

.3 Install motorized dampers according to the manufacturer's recommendations, and also in such a way as to allow proper installation of actuators by Division 25.

.4 In the case of fire-rated ceilings, hang the elements from the building structure, not from the ceiling grid (suspended). Once installation is complete, check that the ceiling's NFPA and ULC fire-resistance rating is fully complied with.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 23 05 13 - General requirements for HVAC motors.

.2 Section 23 05 48 - Anti-vibration systems and devices for HVAC piping and equipment.

.3 Section 23 33 00 - Air duct accessories.

1.2 REFERENCES

.1 American National Standards Institute/Air Movement and Control Association (ANSI/AMCA)
.1 ANSI/AMCA Standard 99, Standards Handbook.
.2 ANSI/AMCA Standard 210/(ANSI/ASHRAE 51), Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
.3 ANSI/AMCA Standard 300, Reverberant Room Method for Sound Testing of Fans.
.4 ANSI/AMCA Standard 301, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

1.3 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION AND HANDED OVER ON COMPLETION OF WORK

.1 Provide the documents and samples required in accordance with the general specifications.

1.4 REPLACEMENT/MAINTENANCE MATERIALS TO BE SUPPLIED

.1 Materials/Replacement materials
.1 Provide the following.
.1 A list of spare parts recommended by each manufacturer, such as bearings and seals.
.2 Addresses of suppliers where spare parts can be obtained.
.3 A list of special tools required for adjustment, repair and replacement of parts.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

.1 Performance requirements

.1 Technical data taken from manufacturers' documentation must be reliable data, confirmed by tests carried out by the manufacturers themselves, or on their behalf, by independent laboratories, and certifying the conformity of the components to the requirements of the codes and standards in force.
.2 Equipment features: flow rate, static pressure, mechanical power in bhp, efficiency, speed in rpm, model, dimensions, sound power level, as indicated in the parts list.
.3 Fans: statically and dynamically balanced, built to ANSI/AMCA 99 standards.
.4 Noise levels: conforms to ANSI/AMCA 301; tested to ANSI/AMCA 300. Units must bear ANSI/AMCA noise certification label.
.5 Unit performance characteristics: based on tests carried out in accordance with ANSI/AMCA 210. Units must bear the ANSI/AMCA certification label, except for axial fans with a diameter of less than 300 mm.

2.2 FANS - GENERAL INFORMATION

.1 Motors
.1 As specified in the section on general requirements for HVAC motors and in this section.
.2 For use with starter
.3 Power as indicated.

.2 Accessories and other items: sets of matching V-belts, adjustable mounting bases, belt guards, coupling housings, safety grids at the outlets, as shown on the drawings and specified in the section on general requirements for motors for HVAC equipment.

.3 Before assembly, the parts are primed with a color selected from the manufacturer's standard range.

.4 Drainage points on the volute casing, as indicated.

.5 Bearing lubrication system with extension tubes when bearings are not easily accessible.

.6 Vibration isolation: in compliance with the section on anti-vibration and seismic systems and devices for HVAC piping and equipment.

.7 Flexible sleeves: comply with the section on accessories for air ducts.

.8 Equipment features: flow rate, total static pressure, rotation speed, power, dimensions, model and noise level.

.9 Noise level rating: complies with AMCA (Air Moving and Conditioning Association) 30176 standard-.
.1 Tests: in accordance with AMCA 300-67. Fan must bear AMCA label confirming sound intensity.

.2 Modular assembly fans must comply with the ARI-260P standard.

.10 Fans: statically and dynamically balanced, built in compliance with AMCA standards 9983-, 201-73, 302-74 AND 303-79.

.11 Ratings must be based on tests conducted in accordance with AMCA 21074-, ARI-430 and ASHRAE 5185-. With the exception of fans with impellers less than 300 mm (12") in diameter, all units must bear the AMCA certification label.

.12 Bearings: Heavy-duty, grease-lubricated, hermetically sealed ball or roller bearings with oil- and dust-tight seals, providing 200,000 h service life, in compliance with -AFMBALL10 -(Anti-Friction Bearing Manufacturers Association). Compliance with selection and performance characteristics: AFMBA9 and AFMBA11.
.1 Acceptable products: "Fag, NTN, SKF, Seal Master, Timken".

.13 High-efficiency electric motors as specified in the section on general requirements for HVAC motors.

.14 Accessories and other components: including V-belt drive units, motor bases with adjustable slides, belt guards, coupling housings, intake safety grids and pulleys.

.15 Units factory-coated with primer in a color chosen from the manufacturer's standard range. Parts must be painted before installation. When a steam distributor (humidifier) is installed in the system upstream of the fan, all interior parts of the fan (inside casing, volute, impeller, hardware, etc.) must be epoxy-coated.

.16 Evacuation points on the volute where required.

.17 Inertia bases and vibration dampers in accordance with the section on anti-vibration systems and devices for HVAC piping and equipment.

.18 The fans are described on the drawings. Equivalent products must provide the flow rates requested for an identical impeller in terms of blade type, diameter and width, while not exceeding the specified "TPM" by more than 5%.

2.3 CENTRIFUGAL FANS

.1 Fan wheels :
.1 Welded steel or aluminum construction.
.2 Maximum speed of centrifugal fans not exceeding 50% of critical speed.
.3 Airfoil aerodynamic vanes, unless otherwise specified.

.2 Ball or roller bearings, spherical, grease-lubricated, with diametral, dust-tight and oil-retention seals, with a certified service life of at least 80,000 hours in accordance with ABMA

L10 service life standard-. Bearing ratings should be selected in accordance with ABMA 9 and ABMA 11. Provide bearing lubrication.
.1 Acceptable products: SKF; NTN Seal Master; Timken, FAG.

.3 Carters :
.1 Volute-shaped steel housings with inlet cones for impellers 300 mm (12") diameter and larger, and steel housings for smaller impellers with welded spacers and brackets. Discharge outlet adaptable for fans with impeller diameters up to 675 mm (27 in.), and fixed for larger impellers.
.2 Longitudinal or transverse joint housings with flanges on each part to allow bolting, and stainless steel, non-flammable seals.
.3 Bolted, airtight access doors with handles.

.4 Flow control devices :
.1 Installation by fan manufacturer.
.2 Adjustable, suction-mounted dampers controlled by a central mechanism connected to each damper. At the ends, each damper must be mounted on bronze bearings. On DLDO fans, dampers shall be coupled for simultaneous operation. Locking devices should allow manual adjustment.
.3 Partial shut-off of the circuit by means of an adjustable damper connected to the controls, allowing the flow rate at the inlet to be varied. In the case of DLDO fans, a mechanism must enable the flow rate to be varied simultaneously at both inlets. A locking device must enable manual adjustment.
.4 Partial sealing of the circuit using a movable disc connected to controls that allow it to be moved from the rear to the front of the SLSO fan.

.5 Acceptable products: Cook, Greenheck, New York Blower, Twin City Fan.

PART 3 - EXECUTION

3.1 FAN INSTALLATION

.1 Install fans as indicated, including the necessary accessories, i.e. flexible mounting studs complying with the section on Anti-vibration systems and devices for HVAC piping and appliances, flexible electrical conductors and flexible fittings complying with the section on Air duct accessories.

.2 Supply and install the drive pulleys and belts required for final air flow balancing.

.3 Lubrication system bearings and extension tubes must be easily accessible.

.4 Doors and access panels must be easily accessible.

.5 Install flexible connection sleeves on fan inlet and outlet ducts. Ensure that the metal collars of the connections are parallel and have the minimum required flexibility between the air duct and the fan when the latter is running. Flexible connection sleeves must not be under tension when the fan is running.

.6 Install shock absorbers as indicated.

.7 Install flexible connection sleeves at fan inlet and outlet. Ensure that the metal collars of the connections are parallel and have a minimum flexibility of 25 mm (1") between the air duct and the fan when the latter is running.

.8 Install dampers in accordance with general regulations. Flexible connection sleeves must not be under tension when the fan is running.

.9 Install fans at a height that allows adequate drainage of their drip trays.

.10 Install range hood exhaust fans so as to maintain a height of 1.0 m (40") between the finished roof level and the fan air outlet.

3.2 ANCHOR BOLTS AND MOUNTING TEMPLATES

.1 Supply anchor bolts and mounting templates, which will be installed under other divisions.

END OF SECTION

PART 1 - GENERAL

1.1 STUDIO DRAWINGS

.1 Submit shop drawings in accordance with specifications.

.2 Shop drawings must clearly indicate :
.1 Appliances, power ratings, piping layout and connections.
.2 Dimensions, construction details of internal and external parts, diagrams of recommended installation method and proposed structural steel supports, and dimensions and location of holes for mounting bolts.

1.2 MAINTENANCE SHEETS

.1 Provide the necessary maintenance sheets and attach them to the operation and maintenance manual.

PART 2 - PRODUCTS

2.1 HORIZONTAL FAN HEATERS

.1 Cladding: 1.2 mm-thick, cold-rolled sheet steel with a gloss enamel finish and threaded bushes for suspension rods.

.2 Heating elements: seamless copper tubes, connected by silver brazing to steel distributors and fitted with aluminum fins mechanically fixed at regular intervals. Heating elements must have passed a hydrostatic leak test at a pressure of 1 MPa.

.3 Fan: direct-drive, factory-balanced, helical fan with anti-corrosion primer and safety guard.

.4 Motor: at specified speed, for continuous duty, with built-in overload protection and mounted on flexible supports.

.5 Supply air: with four sets of adjustable blades.

.6 Power: as indicated.

.7 Room thermostat: electric, line voltage, mounted on unit.

.8 Control relay mounted on the unit to receive a control signal as specified.

.9 Acceptable product: Rosemex, Reznor, Trane or approved equivalent.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install unit heaters in accordance with the piping layout. Allow for pipe expansion and contraction during normal operation.

.2 Ensure that there are sufficient clearances around the units to allow maintenance personnel to carry out their work. Should the final location differ from that shown on the drawings, consult the engineer before proceeding with installation.

.3 If permissible clearances cannot be met, consult the engineer and follow his instructions.

.4 Refer to the installation drawings supplied by the manufacturer. Check that the power supply for each unit corresponds to that indicated on the nameplate.

.5 Ensure that all accessory connection openings and the actual weight of the units are in accordance with the workshop drawings.

.6 Valves: Install isolation and balancing valves on each unit.

.7 Bleeders: fit liquid heat transfer fluid unit heaters with standard air bleeders and valves.

.8 Clean all finned tubes and straighten if necessary.

.9 Install unit heaters at the specified height: where this is not indicated, follow the engineer's instructions. Adjust supply air pattern as required.

.10 If necessary, supply and install additional steel hangers.

.11 For electric thermostats, use standard outlet boxes.

END OF SECTION

PARTIE 1 - GENERALITIES

1.1 REFERENCES

.1 American National Standards Institute (ANSI)/The Instrumentation, Systems and Automation Society (ISA).
.1 ANSI/ISA 5.5, Graphic Symbols for Process Displays. Style P2

.2 American National Standards Institute (ANSI)/ Institute of Electrical and Electronics Engineers (IEEE).
.1 ANSI/IEEE 260.1, American National Standard Letter Symbols Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units).

.3 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc (ASHRAE).
.1 ASHRAE STD 135, BACNET - Data Communication Protocol for Building Automation and Control Network.

.4 Canadian Standards Association (CSA)/CSA International.
.1 CAN/CSA-Z234.1, Canadian Metric Guide.

.5 Consumer Electronics Association (CEA).
.1 CEA-709.1, Control Network Protocol Specification.

.6 Department of Justice Canada (Jus).
.1 Canadian Environmental Assessment Act (CEAA), c. 37.
.2 Canadian Environmental Protection Act (CEPA), c. 33.

.7 Health Canada - Workplace Hazardous Materials Information System (WHMIS).
.1 Material Safety Data Sheets (MSDS).

.8 Transport Canada (TC).
.1 Transportation of Dangerous Goods Act (TDGA), c. 34.

1.2 ACRONYMS AND ABBREVIATIONS

.1 List of acronyms used
.1 AEL - Average Effectiveness Level.
.2 EA - Analog input.
.3 AIT - Agreement on Foreign Trade.
.4 SA - Analog output.
.5 BACnet - Building Automation and Control Network.
.6 CB - Building controller.
.7 CCA - Centre de contrôle d'ambiance.
.8 CAD - Computer-aided design.
.9 CDL - Control Description Logic.
.10 SC - Control diagram.

.11 COSV - Change of State or Value.
.12 CPU - Central Processing Unit.
.13 EN/ED - Digital/digital input.
.14 SN/SD - Digital/digital output.
.15 PD - Differential pressure.
.16 ECU - Equipment Control Unit.
.17 EMS - Energy Management System.
.18 HVAC - Heating, ventilation and air conditioning.
.19 DI - Interface device.
.20 I/O - Input/Output.
.21 ISA - Industry Standard Architecture (ISA).
.22 LAN - Local Area Network.
.23 UCL/PCL - Local control unit/panel.
.24 UCP/PCM - Master Control Unit or Master Control Panel.
.25 NAFTA - North American Free Trade Agreement.
.26 NC - Normally closed.
.27 NO - Normally open.
.28 . SE - Operating system.
.29 O&M - Operation and Maintenance.
.30 PT - Workstation.
.31 PC - Personal Computer.
.32 ICP - Peripheral control interface.
.33 PCMCIA - Personal Computer Micro-Card Interface Adapter.
.34 PID - Proportional, integral, derivative.
.35 RAM - Random Access Memory.
.36 PS - Static pressure.
.37 ROM - Read Only Memory.
.38 UCT/PCT - Terminal control unit/panel.
.39 USB - Universal Serial Bus.
.40 UPS - Uninterruptible Power Supply.
.41 VAV - Variable air volume.

1.3 DEFINITIONS

.1 Point: a point can be logical or physical.
.1 Logic points: values calculated by the system, e.g. totals, counts, corrections following results and/or control logic instructions (CDL).
.2 Physical points: inputs or outputs of equipment connected to controllers monitoring or giving the status of contacts or relays that interact with related equipment (on, off) or with valve or damper actuators. Style P1

.2 Point type: points are classified according to the following objects:
.1 EA (analog input).
.2 SA (analog output).
.3 EN/ED (digital/digital input).
.4 SN/SD (digital/digital output).
.5 Pulsed signals.

.3 Symbols and abbreviations for engineering units used in displays: conform to ANSI/ISA S5.5.
.1 Printer outputs: ANSI/IEEE 260.1 compliant.
.2 See also section 25 05 54 - EMS - Equipment identification.

1.4 SCOPE OF WORK

.1 All articles of section 21 05 01 must be respected by this section.

.2 Work applicable to the control, command or regulation mentioned in divisions 21, 22, 23 and 25 and/or in the plans of said divisions is an integral part of this section.

.3 The work includes, but is not limited to, labor, materials, installation, testing and commissioning of the control systems or parts of systems for this work.

More specifically, this work includes, but is not limited to:
.1 Supply, install and connect new local control panels.
.2 Supply, install and connect the required wiring, conduit and tubing.
.3 Provide electrical power to local controllers and panels from circuit breakers specified in Division 26.
.4 Supply, install and connect all devices required to comply with control sequences.
.5 Supply and install all required brackets and hangers.
.6 Identify all components (panels, controllers, input/output devices, control valves, motorized dampers, wiring, etc.) as specified.
.7 Carry out any work required on controls to enable the balancing contractor to carry out his TAB work (positioning of valves, dampers, etc.) at the request of the balancing contractor, engineer and/or owner.
.8 Commission all inspected equipment.

.4 Refer to the table of contents for a list of sections applicable to automatic control.

1.5 SYSTEM DESCRIPTION

.1 Metric units must be expressed in accordance with CAN/CSA Z234.1.

.2 Operating and display language
.1 Provide appropriate access codes for use of the system in French.
.2 All software and information must be presented in French.

.3 Control devices should be chosen to ensure the best possible operation without oscillation, while providing sufficient sensitivity.

.4 Only the latest-generation products should be submitted.

.5 Control systems will be digital, as specified in the plans and specifications. However, some protection may be electrical.

.6 The new controllers are to be integrated into the existing central control system in the Contrôle AC building.

.7 Acceptable products: "DELTA, HONEYWELL, RELIABLE, SIEMENS, JOHNSON CONTROLS".

1.6 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Supply documents and samples in accordance with general specifications.

.2 Quality control :
.1 Submit proof of compliance with referenced standards, including shop drawings and technical data sheets. A label or approval document from the standards organization is acceptable proof of conformity.
.2 In lieu of acceptable proof, submit a certificate issued by a testing agency approved by the Consultant, attesting that the equipment has been tested in accordance with the agency's standards/code.
.3 In the case of equipment whose quality is not governed by an organization using an approval list or label as proof of conformity, provide a certificate stating that the equipment conforms to the relevant referenced standard or specification.
.4 Submit to the Consultant an acceptance certificate issued by the competent authority.

.3 These designs include, more specifically, but not limited to:

.1 Technical information on control systems and their components (controller, temperature sensor, transmitter, etc.).
.2 Electrical schematics and diagrams for each control system produced using standard drawing software.
.3 Electrical diagrams for starters (fan, pump, etc.) and other equipment to be tested (humidifier, generator, etc.).
.4 Complete control system architecture including all controllers, communication modules, etc.
.5 Plan views showing the location of each control panel.
.6 The stitch list, clearly indicating which stitches are used and which are free.
.7 Equipment list.
.8 The operating sequence.
.9 Procedures, diagrams and troubleshooting guide.
.10 Preventive maintenance requirements.

.4 Obtain electrical diagrams of starters and other required controls from Divisions 21 to 26 and others.

.5 On the list of equipment to be used in the present work, indicate the manufacturer's name, model number and details of the materials used to manufacture each component.

.6 Consult the manufacturers' data and pass on the necessary information to the other sections, so that they can plan the spaces required for their installation.

1.7 DOCUMENTS/ ITEMS TO BE HANDED IN ON COMPLETION OF WORK

.1 Supply the required documents in accordance with general specifications.

.2 . 2Drawings after completion, including any modifications made during the work :
.1 Schematics showing all control elements, including connection terminals for each device, electrical diagrams, etc.
.2 The architecture of the centralized management system showing computer stations, digital controllers, communication networks including identification of the type of cable used, protocols, active components and UPS units.
.3 A physical plan showing the location of control panels and control units, and the routing of piping, cabling and pneumatic control lines.

.3 Also provide three hard copies of the com-plete diagrams of these control systems after completion of the work. These diagrams will be wrapped in clear, rigid plastic and installed in the vicinity of each system, as specified.

.4 Operation and maintenance manuals

.1 Operations and maintenance manuals should be comprehensive in scope, and written in concise language that can be easily understood by operating personnel. Terminology should be consistent for all operational and functional requirements. Do not assume that operating personnel have knowledge of computers or electronics, or in-depth theoretical knowledge of control systems.

.2 The manuals must contain the following information:

.1 List of components, manufacturer's name, model used and specifications.

.2 A list of all software, including version numbers, for each computer in the building automation system.

.3 One copy for each controller of the programming implemented (flowchart, text or object programming, as appropriate).

.4 For each control panel, a list of input/output points and an indication of free points.

.5 Operating sequences.

.6 Numbers of distribution panels and circuit breakers associated with normal/emergency power sources;

.7 the name, address and telephone number of each subcontractor who installed equipment, and of local representatives of equipment suppliers, for each system;

.8 test procedures and reports, including start-up procedures, test procedures, control tests and final commissioning reports, as required.

.3 Information on system operation should include the following:

.1 operating principle;

.2 design philosophy;

.3 the specific functions of the design philosophy and the system;

.4 peripheral operation, input/output formats;

.5 hardware functions and component characteristics, for each function and system operating mode;

.6 full details of data communications, including data types and formats, data processing and linking elements, interfaces;

.7 step-by-step procedures for operating the system, including the actions required at each workstation;

.8 return to normal operation after an emergency, alarm or failure;

.9 List of programmed alarms.

.10 The list of programmed times.

.11 A printout of the implemented graphics.

.12 detailed instructions for start-up, operation of back-up equipment, execution of all system functions and operating modes, including the entry of every command, so that the operator need only refer to these pages to find out what he needs to hit on the keypad to view information or enter a command.

.13 All documentation relating to system configuration, including any changes required for hardware and software modifications during the useful life of the system.

.4 Software documentation must include the following:

.1 the necessary data concerning theory, design, interface requirements, various functions, including test and verification procedures;

.2 detailed descriptions of program capabilities and conditions of use;

.3 the data needed to allow modification, relocation and reprogramming, and to enable program modules to react to changes in the system's functional requirements, without interrupting normal operations;

.4 software modules, source code with required annotations, error-free source code files ready for loading via peripherals;

.5 all cross-references between programs and links, required data exchanges, lists of necessary subprograms, data file requirements, other information necessary for program loading, integration, interfacing and execution;

.6 the software driving each controller, and the description, in a single section, of the functions and parameters common to all controllers.

.5 Interview:

.1 A list of maintenance tasks and the frequency with which they must be performed, for each component requiring it, including where applicable:

.1 Component to be replaced with model and distributor name (battery, fuses, etc.).

.2 Tests and checks to be carried out on critical components.

.3 Calibration methods.

.4 Troubleshooting methods.

.6 A copy of the as-built drawings.

.5 Following adjustments requested by the designated professional, provide the owner with three paper copies and one electronic PDF copy of the technical documents at the end of the project, as well as an electronic copy that can be modified in Excel, Visio, Word, etc. format, as required.

.1 This file will also have to be implemented in the site's operating station to enable users to access this information.

.6 Also provide an additional copy of the licenses required for the project.

1.8 QUALITY AND SERVICE ASSURANCE

.1 Workforce qualification
.1 The installer must be an expert in the field, have at least three years' proven experience in carrying out work of the type and scope described herein, and possess the required qualifications.

.2 Have an office located less than 50 km from the project site, and have qualified personnel on hand for routine maintenance and system troubleshooting.

.3 At all times, the contractor must be able to provide technical support 24 hours a day, 7 days a week.

1.9 EXISTING CONTROL/REGULATION EQUIPMENT

.1 Use existing wiring and control lines, if specified and in good condition.

.2 Control devices that can be reused in their original configuration may be reused provided they comply with applicable codes, standards and regulations.
.1 It is forbidden to modify the initial design of an existing device without the written permission of the Consultant.
.2 If there are any doubts about the reuse of existing equipment, supply new equipment of the appropriate design for the project.

.3 Existing devices intended for reuse must be inspected and tested 30 days after contract award, but before new devices are installed.
.1 Provide the test report listing each device to be reused and indicating whether it is in good condition or requires repair, in which case the Consultant will carry this out.
.2 Failure to produce a test report means that the Contractor accepts the existing devices.

.4 Defective components
.1 Provide, with the test report, specifications or functional requirements to support the results.

.5 Before starting any work, submit a written request for permission to disconnect control/regulation devices and take equipment out of service.

.6 Place existing control devices that will not be reused or are not needed in an approved storage area.

.7 All equipment that will not be reused must be returned to the owner. The same applies to panels.

.8 If there is any doubt as to whether existing equipment can be reused, in such cases supply new equipment of a design appropriate to the project. Provide a list of equipment included in the bid. Also indicate the unit price of all items of equipment.

1.10 EQUIPMENT AND SPARE PARTS

.1 Supply the replacement/maintenance materials/materials required in accordance with the specifications on the Documents/Elements to be handed over on completion of the work, in addition to the following items:

.2 Provide a kit of all the special tools needed to maintain equipment, in accordance with manufacturers' recommendations.

PARTIE 2 - PRODUCTS

2.1 GENERAL

.1 Use equipment and appliances of current manufacture, CSA-certified and ULC-listed where applicable, complying with referenced standards and meeting any other prescribed requirements.

.2 In cases where CSA-certified equipment is not available, submit the proposed equipment to the inspection authorities for approval before delivery to the job site.

.3 Unless otherwise specified, use new materials and equipment.

.4 Spare parts for control units must be readily available.

.5 Check factory-made joints and retighten if necessary to ensure continuity of installation.

2.2 FINISH

.1 Clean and touch-up shop-painted surfaces that have been scratched or damaged during shipping and installation; use paint of the same type and color as the original paint.

.2 Clean and prime non-galvanized hooks, brackets, fasteners and other exposed fastening devices to protect them from rust.

PARTIE 3 - EXECUTION

3.1 INSTALLATION OF INSTRUMENTS AND OTHER COMPONENTS

.1 Carry out the installation in accordance with the general instructions and those in this section.

.2 Supply and install the mounting hardware required for an industrial-quality, reliable and easy-to-adjust installation.

.3 Supply, install and connect all instruments and other components required for the correct operation of the control sequences described in this specification.

.4 Disconnect and interrupt all power sources before starting connection work on existing equipment, and for the duration of the work.

3.2 ON-SITE QUALITY CONTROL

.1 Carry out quality control in accordance with general regulations.

.2 The owner and/or engineer reserves the right to refuse any installation deemed unsatisfactory. The contractor must then correct the installation at his own expense.

3.3 WORKS SUPERVISION AND CONTROL

.1 The contractor must have complete control over the work, and must effectively direct and supervise the work to ensure compliance with the documents.

.2 He must be solely responsible for the means of construction, methods, techniques, sequences and procedures, as well as for the coordination of all parts of the work performed under the contract.

3.4 WARRANTY AND TESTING

.1 Check all systems and take responsibility for any defects that may occur within one year of final acceptance of the work by the engineer, replacing any defective equipment if necessary.

.2 If, for any reason, a device does not function properly, the present contractor will be obliged, at the engineer's request, to make the necessary modifications so that the system functions normally, even if this means changing connections, undoing installations, relocating control devices, redoing programming, etc. He will provide all the personnel and instruments required to make these adjustments. He will have to provide all the personnel and instruments needed to make these adjustments.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 No

1.2 REFERENCES

.1 Public Works and Government Services Canada (PWGSC)/Real Property Branch/Architectural and Engineering Services
.1 MD13800, Energy Management and Control Systems (EMCS), Design Manual, ftp://ftp.pwgsc.gc.ca/rps/docentre/mechanical/ me214-e.pdf

1.3 SEQUENCING (FEDERAL GOVT.)

.1 The sequencing of system operations should be presented in accordance with MD13800, Energy Management and Control Systems (EMCS), Design Manual.

1.4 CONTROL SEQUENCES

.1 VE-1 exhaust fan
.1 Description
.1 The VE-1 exhaust fan evacuates the dust created when filling cattle feed carts.
.2 System at standstill
.1 The exhaust fan is off.
.2 The fresh air intake dampers are in their normal position, i.e. normally closed.
.3 The exhaust fan insulation damper is in its normal position, i.e. normally closed.
.3 System on
.1 On confirmation of start via the operator (selector button on graphic) or on start via push-button, a command to open the fresh air intake dampers and isolate the exhaust fan. On confirmation of full damper opening via a position switch, a run permission is sent to the fan starter, and the fan starts. On confirmation of fan operation, the following sequence of operations can take place:
.1 The exhaust fan cannot be selected for program start-up in the following cases:
.1 The selected fan selector button is activated in off mode.
.2 The fan is in alarm.
.2 Alarm and supervision
.1 Exhaust fan alarm

PART 2 - PRODUCTS

2.1 NO OBJECT

.1 Not applicable.

PART 3 - EXECUTION

3.1 MODIFICATIONS TO SEQUENCES

.1 The Consultant reserves the right to revise the operating sequence or subsequent control logic prior to finalization of the software, at no additional cost to the Consultant.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Divisions applicable to this section :
- .1 Division 26 - Electricity

.2 Other applicable documents :
- .1 General documents from architect and/or owner.
- .2 General terms of contract.

1.02 REFERENCESTANDARDS

.1 CSA Group
- .1 CSA-C22.10-18, Quebec Construction Code, Chapter V - Electricity.
- .2 CAN3-C235-83(C2010), Recommended voltages for AC networks from 0 to 50,000 V.
- .3 CSA-Z462-12, Electrical safety in the workplace.

.2 Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)
- .1 IEEE SP1122-2000, The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

.3 This section is complementary to the general clauses of the contract as well as those of the owner's and/or architect's specifications.

1.03 DEFINITIONS

.1 Electrical and electronic terms: unless otherwise specified, terminology used in this section and on drawings is based on that defined in IEEE SP1122.

1.04 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit required documents and samples.

.2 Technical data sheets
- .1 Submit required technical data sheets and manufacturers' instructions and documentation. Data sheets shall include product characteristics, performance criteria, dimensions, limits and finish.

.3 Studio drawings
- .1 Wiring diagrams and appliance installation details shall show the proposed location, layout, layout, control panels, accessories, piping, ducts and all other items which must be shown in order to achieve a coordinated installation.
- .2 Wiring diagrams shall show terminal blocks, internal wiring of each device and interconnections between different devices.
- .3 Drawings shall show clearances required for operation, maintenance and replacement of equipment.
- .4 Submit various drawings to Engineer for approval by e-mail, in "PDF" format.
- .5 If changes are required, inform Engineer before changes are made.

.4 Certificates

.1 Provide CSA certified equipment.
.2 Where CSA certified equipment is not available, submit proposed equipment to Régie du bâtiment du Québec (RBQ) for approval prior to delivery to job site.
.3 Permits and rights: as per general conditions of contract.

.5 Manufacturer's on-site inspection reports: submit to Engineer, not later than three (3) days after completion of installation and electrical instrument inspections and tests prescribed in PART 3, ON-SITE QUALITY CONTROL, a written report from the manufacturer showing that work complies with prescribed criteria.

1.05 DOCUMENTS/COMPONENTS TO BE HANDED OVER ON COMPLETION OF WORK

.1 Operation and maintenance sheets: provide operation and maintenance instructions to be incorporated into operation and maintenance manual.
.1 Provide operating instructions for each main system and for each main appliance prescribed in the relevant sections of the specification, for use by operating and maintenance personnel.
.2 Operating instructions shall include the following.
.1 Wiring diagrams, control diagrams, control sequence for each main system and for each device.
.2 Start-up, set-up, adjustment, lubrication, operation and shut-down procedures.
.3 Safety measures.
.4 Procedures to be followed in case of breakdown.
.5 Other instructions, as recommended by the manufacturer of each system or device.
.3 Provide printed or engraved instructions, framed in glass or laminated in approved manner.
.4 Post instructions in approved locations.
.5 Operating instructions exposed to the weather must be made of resistant material or enclosed in a weatherproof envelope.
.6 Ensure that operating instructions will not discolor if exposed to sunlight.

1.06 TRANSPORT, STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with this section and manufacturer's written instructions.

.2 Delivery and acceptance: deliver materials and equipment to site in original packaging, which must be labelled with manufacturer's name and address.

.3 Storage and handling
.1 Store materials and equipment in a clean, dry, well-ventilated area in accordance with manufacturer's recommendations.
.2 Store materials and equipment in such a way as to protect them from marks, scratches and abrasions.
.3 Replace damaged materials and equipment with new.

1.07 MATERIALS AND EQUIPMENT

.1 All materials and equipment must be new, of the highest quality and bear a certification seal recognized by the Régie du bâtiment du Québec (RBQ) (e.g. CSA, ULC, cETL, etc.). Obtain approval from the engineer and the RBQ if the material or equipment does not have a recognized seal.

.2 Manufacturers' labels must remain visible and legible on materials and equipment, even after installation.

1.08 DEFINITIONS

.1 "Supply / Fourniture": to supply, install, connect, adjust, support or any other manoeuvre to make the assembly compliant and functional.

.2 "Install / Installation" also implies "supply" (see previous point), unless otherwise specified.

.3 "Remove": complete removal of equipment.

.4 "Dismantle" has the same definition as "remove" (see previous point).

1.09 PLANS AND QUOTATIONS

.1 Plans and specifications have the same value, whether the information is found in one, the other or both, the requirements must be met.

.2 Provide all materials and labor required to achieve required result, even if not shown on plans or specifications.

.3 Notify Engineer of any discrepancies in plans and/or specifications during bidding period. If the contractor omits this step, it is understood that the most expensive solution takes precedence, and therefore no supplement may be requested by the contractor in connection with this contradiction.

1.10 SUBMISSION

.1 Contractor is responsible for verifying that he has the most up-to-date documents before submitting his bid. All addenda issued are an integral part of the project and must be included in the Contractor's proposal.

.2 It is strongly recommended [mandatory] that the contractor visit the site in order to become familiar with existing conditions. No extra charge will be made to the contractor for existing conditions which would have been seen by the contractor had he visited.

1.11 IDENTIFICATION

.1 Ensure that nameplates, nameplates, identification labels, compliance logos (CSA, cUL, etc.), etc. are perfectly legible once the equipment is in place.

1.12 LICENSES, PERMITS AND CERTIFICATES

.1 Obtain and pay for all permits and certificates required to complete the work.

.2 Contractor must present a valid license in accordance with the Building Act. This license must be renewed in the event it expires during the course of the work.

.3 If the contractor is unable to demonstrate the above documents, the Owner reserves the right to refuse his bid for non-conformity.

PART 2 - PRODUCTS

2.01 DESIGN REQUIREMENTS

.1 Operating voltages to be in accordance with CAN3-C235.

.2 Motors, electric heaters, command/control/regulation and distribution devices shall operate satisfactorily at the frequency of 60 Hz and within the limits established in the aforementioned standard.
- .1 Devices must be able to operate without damage under the extreme conditions defined in this standard.

.3 Language of operation and display: provide nameplates and labels bilingual for identification and display purposes for control/control devices.

.4 Use nameplate [or label] for this purpose.

2.02 MATERIALS/MATERIALS

.1 Material and equipment to be CSA certified. In cases where CSA certified material or equipment cannot be obtained, submit replacement material and equipment to Régie du bâtiment du Québec (RBQ), prior to delivery to job site, in accordance with PART 1, DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION.

.2 Control panels and component assemblies to be factory assembled.

2.03 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

.1 Verify installation and coordination responsibilities for motors, equipment and controls, as indicated.

.2 Electrical wiring and raceways for command/control circuits: as per section 26 05 34 - Conduits, fixings and conduit fittings.

2.04 WIRING TERMINATIONS

.1 Ensure that cable termination lugs, terminals and screws are suitable for both copper and aluminum conductors.

2.05 EQUIPMENT IDENTIFICATION

.1 To designate electrical equipment, use nameplates and labels complying with the following requirements.
- .1 Indicator plates: 3 mm thick lamicoïd plastic engraving plates, with :
  - .1 black face and white writing (for equipment on normal power supply).
  - .2 red surface and white lettering (for emergency power equipment).
- .2 Plates are to be mechanically fastened by means of tapping screws, with properly aligned lettering, engraved to the core of the plate.
- .3 Format as per table below.

NAMEPLATE FORMAT

Format 1	10 mm x 50 mm	1 line	3 mm high letters
Format 2	12 mm x 70 mm	1 line	5 mm high letters

Format 3	12 mm x 70 mm	2 lines	3 mm high letters
Format 4	20 mm x 90 mm	1 line	8 mm high letters
Format 5	20 mm x 90 mm	2 lines	5 mm high letters
Format 6	250 mm x 100 mm	1 line	12 mm high letters
Format 7	25 mm x 100 mm	2 lines	6 mm high letters

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

.3 Nameplate markings to be approved by owner prior to manufacture.

.4 Provide at least twenty-five (25) letters per plate.

.5 Terminal block and junction box nameplates shall indicate mains and/or voltage characteristics.

.6 Nameplates on disconnectors, starters and contactors shall indicate controlled device and voltage.

.7 Indicator plates on terminal boxes and pull boxes must show mains and voltage.

.8 Transformer nameplates shall indicate wattage as well as primary and secondary voltages.

2.06 WIRING IDENTIFICATION

.1 Both ends of the phase conductors of each feeder and branch circuit shall be permanently and indelibly marked with colored numbered plastic tape.

.2 Maintain the same phase order and color code throughout the installation.

.3 Color coding to be in accordance with CSA C22.1.

.4 Use communication cables with uniform color-coded conductors throughout the network.

2.07 IDENTIFYING CONDUITS AND CABLES

.1 Color code conduits, boxes and metal sheathed cables.

.2 Apply plastic tape or paint, as a means of marking, to cables or conduits every 15 m and at wall, ceiling and floor penetrations.

.3 Basic color bands shall be 25 mm wide and complementary color bands shall be 20 mm wide.

Type	Base color	Complementary Color
Up to 250 V	Yellow	
Up to 600 V	Yellow	Green

2.08 FINITION

.1 Surfaces of metal enclosures are to be shop finished with anti-rust primer, inside and out, and at least two (2) coats of enamel paint finish.
- .1 Electrical equipment to be installed outdoors shall be painted "machine green" in accordance with AMEEC Y1-1, latest edition.
- .2 Switchgear and distribution cabinets installed indoors shall be painted lightgrey, in accordance with AMEEC Y1-1, latest edition.

PART 3 - PERFORMANCE

3.01 INSPECTION

.1 Verification of conditions: before proceeding with installation, ensure that the condition of surfaces/substrates previously implemented under other sections or contracts is acceptable and allows work to be carried out in accordance with manufacturer's written instructions.
- .1 Visually inspect surfaces/supports.
- .2 Immediately inform Engineer of any unacceptable condition found.
- .3 Begin installation work only after unacceptable conditions have been corrected.

3.02 INSTALLATION

.1 Unless otherwise specified, complete installation in accordance with CSA C22.1.

.2 Unless otherwise specified, install overhead and underground systems in accordance with **CAN/CSA-C22.3** number 1.

3.03 CONSTRUCTION DOCUMENTS

.1 Make sure you have the "For Construction" documents sealed by the Engineer before starting work.

3.04 HEALTH & SAFETY

.1 Take all necessary steps to ensure the health and safety of workers.

.2 Perform work in accordance with requirements of CSA Z462 "Electrical Safety in the Workplace".

3.05 RESPONSIBILITIES

.1 During the work, the contractor is responsible for his equipment and must protect it adequately (e.g.: vandalism, water, debris, etc.).

.2 Obstruct all conduit ends during work to prevent anything from entering and interfering with subsequent use of conduit.

.3 Install equipment in such a way as to limit clutter and free up as much space as possible, while ensuring access, safety and in accordance with manufacturer's recommendations.

.4 Temporary use of the premises does not commence the warranty period, which begins

only upon final delivery.

.5 Facilities and equipment must be cleaned and restored to good working order before acceptance. Replace damaged equipment.

.6 Ensure that work completed or in progress has adequate protection. Contractor to replace at own expense any work damaged due to lack of protection.

3.06 NETTOYAGE

.1 Cleaning during work: carry out cleaning work. Leave premises clean at the end of each working day.

.2 Final clean-up: remove surplus materials, waste, tools and equipment from site. Clean all equipment so that it is perfectly clean.

.3 Apply a coat of paint to any equipment showing scratches or defects. The color shall be the same as the equipment in question.

.4 Waste management: sort waste for reuse and recycling.
.1 Remove recycling bins and skips from site and dispose of materials at appropriate facilities.

3.07 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste so that it can be directed to the right facilities and place it in appropriate containers according to its type.

.2 Off-site disposal of recyclable waste to appropriate recycling facilities, depending on the nature of the waste.

.3 Dispose of waste containing hazardous or toxic materials off-site to specialized facilities for neutralization or reclamation.

.4 When it is impossible to do otherwise, send waste not corresponding to the above categories to landfill.

3.08 COORDINATION

.1 Become familiar with all construction documents and shop drawings before beginning equipment installation. Ensure that identified locations do not interfere with work of other trades.

.2 The ventilation contractor has priority for the installation of his equipment and will direct other contractors on the routes to be used. Comply with ventilation contractor's instructions.

.3 Coordinate dimensions of equipment concrete bases (clean bases) for all floor-mounted equipment, according to accepted equipment shop drawings. Concrete bases shall be a minimum of 100mm high and have 100mm overhang from equipment attachment to perimeter on all sides.

3.09 TEMPORARY INSTALLATIONS

.1 In the event that equipment is not obtained in time to take possession, the Contractor shall supply and install, at his own expense, temporary equipment to accommodate the Owner.

.2 All temporary work required to carry out the work requested must be included, even if not indicated in the plans and/or specifications. They include both equipment and labor.

3.10 DISMANTLING WORK

.1 When equipment is requested to be "removed" or "dismantled", removal must be carried out for the unit concerned, together with any associated accessory(ies) relating to it (bracket, fixing, etc.). Any unused sections of the power supply (conductors, cables, etc.) or associated controls (switches, etc.) must also be removed. Restore electrical continuity to downstream equipment on the circuit.

.2 For equipment "to be relocated", the contractor shall include the extension of the electrical branch or feeder to the new location. Associated control shall also be relocated as indicated.

.3 Perform dismantling work with minimal impact on building operations. If required, provide temporary services so as not to impact building users.

.4 It is understood that the contractor will relocate any equipment(s) within his discipline that interfere with the installation of equipment of other disciplines, even if not indicated on plans and/or specifications.

.5 Carry out dismantling work at the time agreed with the customer, communicating with the customer at least 3 days in advance of the proposed date.

.6 At the beginning of the work, ask the owner if he wishes to keep any of the equipment requested to be removed on the plans. If so, pay particular attention to the equipment in question and place it in the location identified by the customer. For the rest of the equipment to be removed, the contractor must dispose of it outside the building.

.7 At no time shall contractor reuse removed equipment, unless otherwise specified on plans.

.8 Notify Engineer of any equipment in poor condition to be retained or relocated, do not dismantle until authorized by Engineer. Otherwise, it will be assumed that the equipment removed was in good condition.

3.11 LABELS, NAMEPLATES AND NAMEPLATES

.1 Ensure that CSA labels, nameplates and data plates are visible and legible when equipment is installed.

3.12 SLEEVES AND HOLES

.1 Where plastic sleeves are used for fire-rated wall or floor penetrations, remove before installing conduit.

.2 Before drilling any structural member, obtain approval from structural engineer.

.3 Use water-powered rotary drill for drilling or coordinate with Structural Engineer as to equipment to be used. Impact or vibratory devices are prohibited.

.4 Coordinate with the owner the times when drilling can be carried out, with the aim of minimizing impact on building users in areas adjacent to the work.

.5 All penetrations must be sealed once the service has been routed through them. Use material of same or better characteristics than the partition pierced, particularly with respect to fire resistance or soundproofing. Coordinate with the architect on the material to be used and comply with the architect's material requirements.

.6 Any hole drilled in an existing concrete structure must be "scanned" with X-rays, in order to avoid causing damage to an existing concealed service. The contractor who causes damage by not having previously performed the "scan" requested here will be responsible for the cost of repairs.

.7 Drillings up to 150mm (6") are the responsibility of the electrical contractor. Drilling of larger diameters is the responsibility of the general contractor.

3.13 ACCESS HATCHES

.1 Provide appropriately sized access hatches for any electrical device(s) concealed behind a non-accessible wall or ceiling. Hatches should have the same fire resistance as the partitions in which they are installed. Optimize (group) concealed electrical devices as much as possible, so as to minimize the number of hatches to be used. Prior to installation, obtain the architect's and/or owner's agreement to the location of access hatches.

3.14 LOCATION OF OUTLETS AND SOCKETS

.1 Position outlets and sockets in accordance with section 26 05 32 - Outlet and junction boxes and accessories.

.2 Do not install outlets and sockets back-to-back in a wall; leave a horizontal clearance of at least 150 mm between boxes.

.3 Outlets and receptacles may be relocated at no additional cost or credit, provided relocation does not exceed 3000 mm and notice is given prior to installation.

.4 Place light switches near doors, on handle side.

.1 In mechanical installation and elevator machinery rooms, place disconnecting switches near doors, on the handle side.

3.15 COORDINATION OF PROTECTION DEVICES

.1 Ensure that circuit protection devices such as overcurrent releases, relays and fuses are installed, of the correct rating and set to the required values.

3.16 ON-SITE QUALITY CONTROL

.1 Test the following items:

.1 Circuits from branch panels.

.2 Motors, heaters and associated control/regulation devices, including controls for sequential operation of systems where applicable.

.2 Carry out tests in the presence of the Engineer, if he so requests.

.3 Provide measuring equipment, indicators, apparatus and personnel required for testing during and on completion of work.

3.17 SYSTEM START-UP

.1 Instruct operating personnel in the operation and maintenance of the plant, its equipment and components.

3.18 CHANGES DURING CONSTRUCTION

.1 Modifications to plans and specifications may be required during construction.

.2 No change(s) to plans and specifications shall be made without prior issuance of a change order.

.3 Change orders issued during construction have only the scope indicated therein, all other conditions in plans and specifications remain unaffected. In addition, requirements in plans and specifications (e.g. use of armored cable vs. conduit) apply to requested changes, unless otherwise indicated.

.4 If the modification has an impact on costs, the contractor must submit his proposal to the Engineer for approval. Contractor to submit credit if changes result in lower cost than originally anticipated. Obtain the Engineer's or Owner's acceptance of the amount before starting the requested work.

.5 Contractor's hourly rates shall not exceed those recommended by the Association de la construction du Québec (ACQ).

3.19 ACCEPTANCE OF WORK

.1 Notify Engineer when work is completed for first inspection visit.

.2 Following this visit, an initial list of deficiencies will be issued. The contractor must correct all the points indicated and notify the Engineer when completed, so that a second inspection visit can be made.

.3 Once everything is compliant and acceptable following this second visit, a final acceptance certificate for the work will be issued.

.4 Should the second (or subsequent) visit require additional deficiencies to be listed, these will be invoiced on an hourly basis by the Engineer to the Owner, who will deduct the amounts from the Contractor's contract.

3.20 TRAINING

.1 Provide required documentation and manpower to instruct operating and maintenance personnel on use, operation, adjustments, diagnosis, maintenance or other pertinent information relating to equipment and machinery.

. 3.21 GUARANTEE

.1 Unless otherwise specified, all work and equipment is warranted for a period of one (1) year from provisional acceptance of the work.

.2 This warranty covers both material and labor to repair or replace defective equipment.

.3 Correct promptly any deficiencies identified by the Owner as a result of defective

material, improper installation or any other reason attributable to the Contractor. All work to be done at no cost to Owner.

.4 Any related work required for repairs is also the responsibility of the contractor (gypsum, painting, etc.).

.5 Repaired equipment must meet or exceed the requirements of the plans and specifications.

.6 No final payment or occupancy of the premises by the owner releases the contractor from his obligation under this warranty.

.7 Contractor has five (5) days to begin repair work following receipt of a warranty repair request, failing which Owner may have work done by others and then require full payment by this Contractor.

3.22 PLANS ANNOTATED BY THE CONTRACTOR AT THE END OF THE PROJECT

.1 Provide contractor's annotated "as-built" as-built drawings showing in red ink field decisions that are modifications to Engineer's final drawings.

.2 Indications shall show changes in equipment, wiring and positioning.

.3 Identify each page of plans with a stamp indicating that they are plans annotated by the contractor. The stamp must also be signed and dated by the contractor.

.4 On completion, submit annotated plans to Engineer for verification. Make any necessary corrections based on Engineer's comments.

.5 Finally attach annotated plans to site completion manuals.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 - Electricity - General Requirements.

.2 Section 26 05 21- Wires and cables (0-1000V).

1.02 REFERENCE STANDARDS

.1 CSA Group (CSA)
- .1 **CAN/CSA-C22.2** Issue 18, Outlet Boxes, Conduit Boxes, Fittings and Accessories.
- .2 **CAN/CSA-C22.2** Issue 65, Wire Connectors (trinational standard with **UL 486A-486B** and NMX-J-543-ANCE-03).

.2 Electrical and Electronics Manufacturers Association of Canada (EEMAC)
- .1 **EEMAC 1Y-2-[1961]**, Connectors for feed-through terminals and aluminum adapters (current rating 1200 A).

.3 National Electrical Manufacturers Association (NEMA)

1.03 TRANSPORT, STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with section 26 05 00 and manufacturer's written instructions.

1.04 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste for reuse and recycling in accordance with section 26 05 00.

PART 2 - PRODUCTS

2.01 MATERIALS

.1 Cable pressure connectors to **CAN/CSA-C22.2** No.65, with copper current carrying elements, suitable for copper conductors as required.

.2 Lighting fixture splicing connectors conforming to **CAN/CSA-C22.2** No. 65, with copper current-carrying elements, suitable for copper conductors 10 AWG or less.

.3 Feed-through terminal connectors complying with relevant NEMA standards and consisting of the following components.
- .1 Connector body and clamp for copper conductor.
- .2 Clamp bolts.
- .3 Bolts for copper conductors.
- .4 Size suitable for conductors.

.4 TECK cable clamps or connectors, as required, conforming to **CAN/CSA-C22.2** number 18.

PART 3 - PERFORMANCE

3.01 EXAMEN

.1 Verification of conditions: before proceeding with installation of cable and box connectors, ensure that the condition of surfaces/substrates previously implemented under other sections or contracts is acceptable and allows work to be carried out in accordance with manufacturer's written instructions.
- .1 Visually inspect surfaces/supports.
- .2 Immediately inform Engineer of any unacceptable condition found.
- .3 Begin installation work only after unacceptable conditions have been corrected.

3.02 INSTALLATION

.1 Carefully strip the ends of conductors and cables and then, as appropriate, proceed as follows.
- .1 Apply a coat of zinc-based jointing compound to aluminum cable splices before installing connectors.
- .2 Install pressure connectors and tighten screws using manufacturer's recommended compression tool. Installation must comply with tightening tests performed in accordance with **CAN/CSA-C22.2** number 65.
- .3 Install fixture connectors and tighten in accordance with **CAN/CSA-C22.2** No. 65. Replace insulating cap.
- .4 Install feed-through terminal connectors in accordance with relevant NEMA standards.
- .5 Install stress cones and terminations and make splices in accordance with manufacturer's instructions.
- .6 Ground and bond as required.

3.03 NETTOYAGE

.1 Cleaning during work: carry out cleaning work in accordance with section 26 05 00.
- .1 Leave premises clean at the end of each working day.

.2 Final clean-up: remove surplus materials, waste, tools and equipment from site in accordance with section 26 05 00.

.3 Waste management: sort waste for reuse and/or recycling, in accordance with section 26 05 00.
- .1 Remove recycling bins and skips from site and dispose of materials at appropriate facilities.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 - Electricity - General Requirements.

.2 Section 26 05 29 - Supports and suspensions for electrical installations.

.3 Section 26 05 34 - Conduit, fixings and fittings.

.4 Section 26 05 83 - Connectors for cables and boxes (0 - 1000 V).

1.02 REFERENCE STANDARDS

.1 N/A

1.03 TECHNICAL DATA

.1 Submit technical data sheets as per section 26 05 00.

1.04 TRANSPORT, STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with section 26 05 00 and manufacturer's written instructions.

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste for reuse and recycling in accordance with section 26 05 00.

PART 2 - PRODUCTS

2.01 BUILDING MILLS

.1 Conductors: stranded if 10 AWG and larger; minimum size: 12 AWG.

.2 Aluminum conductors are not permitted for this project, use copper conductors only.

.3 Conductors of specified size, under cross-linked thermosetting polyethylene insulation,

.1 Internal: for 600V and type RW90 XLPE ;

.2 Outdoors or underground: for 1000V and type RWU90 XLPE.

2.02 90 TEAK CABLES

.1 Cables: to conform to Section 26 05 00 - Electrical - General Requirements for Work Results.

.2 Conductors
.1 Supply conductors: copper, size as specified.
.2 Complete with grounding conductor.

.3 Insulation
.1 Cross-linked polyethylene (XLPE).
.2 Rated voltage: 600V.

.4 Sheathing: polyvinyl chloride.

.5 With metal armor.

.6 Outer shell: thermoplastic polyvinyl chloride, conforming to Building Code requirements.

.7 Fasteners
.1 One-hole steel clamps for exposed cables up to 50 mm. Two-hole steel clamps for cables over 50 mm.
.2 U-shaped supports for groups of two or more cables, spaced 1.5m apart.
.3 Threaded suspension rods: 6 mm diameter, for U-brackets.

.8 Connectors
.1 Approved explosion-proof waterproof models suitable for TECK cables.

PART 3 - PERFORMANCE

3.01 ON-SITE QUALITY CONTROL

.1 Test in accordance with section 26 05 00.

.2 Perform tests using methods appropriate to local conditions and approved by Régie du bâtiment du Québec (RBQ).

.3 Perform tests before energizing electrical installation.

3.02 CABLE INSTALLATION - GENERAL INFORMATION

.1 Terminate cables in accordance with section 26 05 20 - Connectors for cables and boxes 0 - 1000 V.

.2 Use cable color coding in accordance with Section 26 05 00 - Electrical - General Requirements for Work Results.

.3 Parallel feeders must be of the same length.

.4 Attach or clip feeder cables to distribution centers, pull boxes and terminations.

.5 Concealed wiring in walls should be routed downhill or in vertical loops to facilitate subsequent work. Unless otherwise specified, avoid routing cabling upwards or horizontally in walls.

.6 Use only two-wire circuits for branches to surge suppression outlets and for permanently connected electronic and computer equipment. Common neutral circuits are not permitted.

.7 Control wiring shall be identified by collars with numbering corresponding to the legend on the shop drawings.

3.03 BUILDING WIRING INSTALLATION

.1 Laying the wire :

.1 in conduits, in accordance with section 26 05 34 - Conduits, conduit fasteners and fittings;

3.04 TECK90 CABLE INSTALLATION (0 - 1000 V)

.1 Whenever possible, group cables on U-shaped supports.

.2 Lay cables, securing them firmly with clamps.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 - Electricity - General Requirements.

.2 Section 26 05 21 - Wires and cables (0 - 1000 V).

1.02 REFERENCE STANDARDS

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

1.03 TRANSPORT, STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with section 26 05 00 and manufacturer's written instructions.

1.04 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste for reuse and recycling in accordance with section 26 05 00.

PART 2 - PRODUCTS

2.01 MATERIALS

.1 Ground continuity conductors: green insulated, copper, of specified gauge.

PART 3 - PERFORMANCE

3.01 EXAMEN

.1 Verification of conditions: before proceeding with installation of earth continuity equipment, ensure that the condition of surfaces/substrates previously implemented under other sections or contracts is acceptable and allows work to be carried out in accordance with manufacturer's written instructions.
- .1 Visually inspect surfaces/supports.
- .2 Immediately inform Engineer of any unacceptable condition found.
- .3 Begin installation work only after unacceptable conditions have been corrected.

3.02 NETTOYAGE

.1 Cleaning during work: carry out cleaning work in accordance with section 26 05 00.
- .1 Leave premises clean at the end of each working day.

.2 Final clean-up: remove surplus materials, waste, tools and equipment from site in accordance with section 26 05 00.

.3 Waste management: sort waste for reuse and recycling in accordance with section 26 05 00.

.1 Remove recycling bins and skips from site and dispose of materials at appropriate facilities.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 - Electricity - General Requirements.

.2 Section 26 05 21 - Wires and cables (0 - 1000 V).

.3 Section 26 05 34 - Conduit, fixings and fittings.

1.02 TRANSPORT, STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with section 26 05 00 and manufacturer's written instructions.

1.03 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste for reuse and recycling in accordance with section 26 05 00.

PART 2 - PRODUCTS

2.01 U-SECTION BRACKETS

.1 U-profile brackets, 4 mm x 41 mm, 2.5 mm thick, for surface or suspended installation.

PART 3 - PERFORMANCE

3.01 INSPECTION

.1 Verification of conditions: before proceeding with the installation of supports and hangers, ensure that the condition of surfaces/substrates previously installed under other sections or contracts is acceptable and allows work to be carried out in accordance with the manufacturer's written instructions.
- .1 Visually inspect surfaces/supports.
- .2 Immediately inform Engineer of any unacceptable condition found.
- .3 Begin installation work only after unacceptable conditions have been corrected.

3.02 INSTALLATION

.1 Secure material to masonry, ceramic and plaster surfaces, using lead anchors or nylon dowels.

.2 Secure material to poured concrete surfaces, using expansion plugs.

.3 Secure equipment to hollow masonry walls or suspended ceilings, using wing bolts.

.4 Attach surface-mounted hardware to suspended ceiling framing T-channels, using torsion clips. Before installing the specified hardware, ensure that the T-channel suspension is strong enough to support the weight.

.5 Support conduits or cables with staples, spring bolts and cable ties designed as U-section accessories.

.6 Use strapping to secure exposed cables or conduits to building structure or components.
- .1 One (1) hole steel strapping for surface mounting of conduits and cables 50 mm diameter or less.
- .2 Two (2) hole steel straps to secure conduits and cables over 50 mm diameter.
- .3 Use clamps to secure conduit to exposed steel framing members.

.7 Suspended support systems
- .1 Support each cable or conduit with 6 mm diameter threaded rods and spring clips.
- .2 Support a minimum of two (2) cables or conduits on U-channels supported by 6 mm diameter threaded suspension rods, where direct attachment to building structure is not possible.

.8 To surface-mount two or more conduits, use U-profiles spaced at a maximum of 1.5m.

.9 Install brackets, mounts, hooks, clamps and other types of metal supports where indicated and where necessary to support conduits and cables.

.10 Provide suitable support for pipes and cables laid vertically, without wall fixings, up to the equipment.

.11 Do not use binding wire or perforated strapping to support or secure pipes or cables.

.12 Do not use supports and equipment installed for other trades as conduit or cable supports.

.13 Install fasteners and brackets as required for each type of equipment, conduit and cable, and according to manufacturer's recommendations.

3.03 NETTOYAGE

.1 Cleaning during work: carry out cleaning work in accordance with section 26 05 00.
- .1 Leave premises clean at the end of each working day.

.2 Final clean-up: remove surplus materials, waste, tools and equipment from site in accordance with section 26 05 00.

.3 Waste management: sort waste for reuse and recycling in accordance with section 26 05 00.
- .1 Remove recycling bins and skips from site and dispose of materials at appropriate facilities.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 - Electricity - General Requirements.

1.02 REFERENCE STANDARDS

.1 CSA Group (CSA)
  .1 CAN/CSA C22.10-18, Quebec Construction Code, Chapter V - Electricity.

1.03 TRANSPORT STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with section 26 05 00 and manufacturer's written instructions.

1.04 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste for reuse and recycling in accordance with section 26 05 00.

PART 2 - PRODUCTS

2.01 JUNCTION AND PULL BOXES

.1 Construction: welded steel boxes.

.2 Covers, for flush mounting: covers with edge projecting at least 25 mm.

.3 Surface-mounted covers: flat, screw-on covers.

PART 3 - PERFORMANCE

3.01 INSTALLATION OF JUNCTION AND PULL BOXES

.1 Install pull boxes in concealed but easily accessible locations.

.2 Only main junction and pull boxes indicated. Install additional boxes as required by CSA C22.1.

3.02 IDENTIFICATION LABELS

.1 Equipment identification: in accordance with section 26 05 00.

.2 Labels: Size 2, indicating network name, rated current, voltage and number of phases.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 - Electricity - General requirements.

.2 Section 26 05 21 - Wires and cables (0 - 1000 V).

.3 Section 26 05 29 - Supports and suspensions for electrical installations.

1.02 REFERENCE STANDARDS

.1 CSA Group (CSA)
- .1 **CAN/CSA-C22.2** Issue 18-[F98(C2003)], Outlet Boxes, Conduit Boxes, Fittings and Accessories, National Standard of Canada.
- .2 **CSA C22.2** number 45-[FM1981(C2003)], Rigid Metal Conduit.
- .3 **CSA C22.2** NUMBER 56-[F04], Flexible metal conduit and liquidtight flexible metal conduit.
- .4 **CSA C22.2** number 83-[FM1985(C2003)], Electrical metal tubing.
- .5 **CSA C22.2** number 211.2-[FM1984(C2003)], Unplasticized polyvinyl chloride rigid pipe.
- .6 **CAN/CSA-C22.2** number 227.3-[F05], Non-metallic Mechanical Protection Tubes (NMMPT), National Standard of Canada.

1.03 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit required documents and samples in accordance with section 26 05 00.

.2 Technical data sheets: submit the required technical data sheets, as well as the manufacturer's specifications and documentation concerning the products in question.
- .1 Submit manufacturer's documentation for cables in question.

.3 Quality assurance
- .1 Test reports: submit test reports issued by recognized independent laboratories.
- .2 Certificates: submit documents signed by the manufacturer, certifying that products, materials and equipment comply with the physical characteristics and performance criteria specified.
- .3 Instructions: submit installation instructions supplied by manufacturer.

1.04 TRANSPORT, STORAGE AND HANDLING

.1Transport , store and handle materials and equipment in accordance with section 26 05 00 and manufacturer's written instructions.

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste for reuse and recycling in accordance with section 26 05 00.

.2 Place substances which meet the definition of toxic or hazardous waste in designated containers.

.3 Ensure that empty containers are sealed and stored properly, out of the reach of children, for disposal.

PART 2 - PRODUCTS

2.01 CONDUITS

.1 Electrical metal tubing (EMT): to **CSA C22.2** No. 83, with fittings.

.2 Rigid metal conduit: conforms to **CSA C22.2** No. 45, galvanized steel, screw-in.

2.02 CONDUIT FITTINGS

.1 1-hole steel clamps for securing exposed conduits with nominal diameters of 50 mm or less.
- .1 2-hole flanges, steel, for fixing conduits with nominal diameters greater than 50 mm.

.2 Beam clamps to secure conduits to exposed steelwork.

.3 U-brackets to support several conduits, to be arranged at 1.5 m centres.

.4 6 mm diameter threaded rods to hold suspension brackets.

2.03 CONDUIT FITTINGS

.1 Fittings: to **CAN/CSA C22.2** No. 18, specially manufactured for specified conduits. Coating: same as for conduit.

.2 Prefabricated L-fittings, to be installed where 90 degree bends are required on 25 mm and larger conduits.

.3 Watertight fittings and connecting sleeves for electrical metal tubes.
- .1 Pressure screw joints are prohibited.

PART 3 - PERFORMANCE

3.01 MANUFACTURER'S INSTRUCTIONS

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

3.02 INSTALLATION

.1 Lay exposed conduits so as not to reduce the clear height of the room and using as little space as possible.

.2 Conceal conduits except those installed in mechanical and electrical installation spaces and in unfinished spaces.

.3 Use electrical metal tubing (EMT) when conduits are not likely to be damaged.

.4 Use explosion-proof flexible connections for explosion-proof motor connections.

.5 Install sealing fittings on conduits installed in hazardous locations.
.1 Fill with sealant.

.6 Use minimum 19 mm conduit.

.7 Cold bending of conduits.
.1 Replace conduits which have suffered a reduction of more than 1/10 of their original diameter as a result of crushing or deformation.

.8 Mechanically bend steel conduits over 19 mm in diameter.

.9 Threading of rigid conduits, carried out on site, must be of sufficient length to allow tight joints to be made.

.10 Remove and replace clogged duct parts.
.1 It is forbidden to use liquids to unblock pipes.

.11 Dry out conduits before routing wiring.

3.03 VISIBLE DUCTWORK

.1 Install conduits parallel or perpendicular to building site lines.

.2 Behind infrared or gas radiators, install conduits leaving a clearance of 1.5 m.

.3 Route conduits through flange of steel framing members, where applicable.

.4 Where possible, group conduits in U-shaped or surface-mounted suspension brackets.

.5 Unless otherwise specified, conduits shall not pass through framing members.

.6 For ducts running parallel to steam or hot water pipes, allow a minimum lateral clearance of 75 mm; also allow a minimum clearance of 25 mm in the case of crossings.

3.04 NETTOYAGE

.1 Clean in accordance with section 26 05 00.

.2 On completion of installation work and performance testing, remove surplus materials, waste, tools and equipment from site.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 Electricity - General Requirements.

1.02 REFERENCE STANDARDS

.1 CSA Group
- .1 CAN/CSA-C22.2 Issue 4, Enclosed and Panel-Mounted Switches (trinational standard with ANCE NMX-J-162-2004 and UL 98).
- .2 CSA C22.2 number 39, Fuse holder.

1.03 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit required documents and samples in accordance with section 26 05 00.

.2 Technical data sheets
- .1 Submit required data sheets, manufacturer's instructions and documentation for fused and non-fused switches. Data sheets shall include product characteristics, performance criteria, dimensions, limits and finish.

1.04 TRANSPORT, STORAGE AND HANDLING

.1 Transport, store and handle materials and equipment in accordance with section 26 05 00 and manufacturer's written instructions.

1.05 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste for reuse and recycling in accordance with section 26 05 00.

PART 2 - PRODUCTS

2.01 SWITCHES

.1 Fused and non-fused switches, current rating as shown on drawings, in NEMA 12 enclosure, to **CAN/CSA-C22.2** number 4, rating as indicated.

.2 Can be locked in closed or open position by three (3) padlocks.

.3 Mechanically interlocked door cannot be opened when lever is in closed position.

.4 Snap-action mechanism.

.5 Indication of "OPEN" and "CLOSED" positions on enclosure cover.

2.02 EQUIPMENT DESIGNATION

.1 Equipment marked in accordance with section 26 05 00 - Electricity - General requirements for work results.

.2 Size 4 nameplate bearing designation of load ordered.

PART 3 - PERFORMANCE

3.01 INSPECTION

.1 Verification of conditions: before proceeding with the installation of fused and non-fused switches, ensure that the condition of surfaces/substrates previously implemented under other sections or contracts is acceptable and allows the work to be carried out in accordance with the manufacturer's written instructions.
- .1 Visually inspect surfaces/supports.
- .2 Immediately inform Engineer of any unacceptable condition found.
- .3 Begin installation work only after unacceptable conditions have been corrected.

3.02 INSTALLATION

.1 Install switches and, where applicable, fuses.

3.03 NETTOYAGE

.1 Cleaning during work: carry out cleaning work in accordance with section 26 05 00.
- .1 Leave premises clean at the end of each working day.

.2 Final clean-up: remove surplus materials, waste, tools and equipment from site in accordance with section 26 05 00.

.3 Waste management: sort waste for reuse and recycling in accordance with section 26 05 00.
- .1 Remove recycling bins and skips from site and dispose of materials at appropriate facilities.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 - Electricity - General Requirements.

.2 Section 26 28 13.01 - Fuses, low voltage.

1.02 REFERENCE STANDARDS

.1 International Electrotechnical Commission (IEC)
- .1 IEC 947-4-1-[2002], Part 4, Electromechanical contactors and starters.

1.03 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR APPROVAL/INFORMATION

.1 Submit required documents and samples in accordance with section 26 05 00.

.2 Technical data sheets
- .1 Submit required technical data sheets and manufacturer's product specifications and documentation. Data sheets shall include product characteristics, performance criteria, dimensions, limits and finish.

.3 Studio drawings
- .1 Submit required shop drawings as per section 26 05 00.
  - .1 Shop drawings submitted must bear the seal and signature of a competent engineer recognized or entitled to practice in Quebec, Canada.
  - .2 Provide, for each type of starter, shop drawings indicating the following:
    - .1 mounting method and dimensions;
    - .2 size and type of starters;
    - .3 the various elements and their layout;
    - .4 enclosure types;
    - .5 wiring diagrams;
    - .6 interconnection diagrams.

1.04 DOCUMENTS/COMPONENTS TO BE HANDED OVER ON COMPLETION OF WORK

.1 Submit operating and maintenance records for each type and model of starter and attach to maintenance manual.

1.05 TRANSPORT, STORAGE AND HANDLING

.1 Transport , store and handle materials and equipment in accordance with section 26 05 00 and manufacturer's written instructions.

.2 Deliver materials and equipment to site in original packaging, which must be labelled with manufacturer's name and address.

1.06 WASTE MANAGEMENT AND DISPOSAL

.1 Sort waste for reuse and recycling in accordance with section 26 05 00.

PART 2 - PRODUCTS

2.01 MATERIALS/MATERIALS

.1 Starters conforming to IEC 947-4, use category AC4.

2.02 FULL-VOLTAGE MAGNETIC STARTERS

.1 Magnetic starters, combined as indicated, of size, type and power rating as indicated, in NEMA 12 enclosure, supplied with the following components and features:
- .1 fast-acting solenoid contactor;
- .2 overload protection device for each motor phase, manually reset from outside the cabinet;
- .3 wiring diagram/principle in a clearly visible place inside the cabinet;
- .4 each wire and terminal provided with a permanent numerical marking, corresponding to that of the wiring diagram/principle, so as to facilitate connection of incoming wires inside the starter.

.2 Combination starters equipped with a disconnecting device operated by a lever placed outside the enclosure, with :
- .1 lockout device in "off" position;
- .2 cabinet door with separate lock;
- .3 provision to prevent motor starting when cabinet door is open.

.3 Accessories
- .1 Robust 3-position ON-OFF-AUTO selector.
- .2 LED indicator lights for heavy duty :
  - .1 Green: On ;
  - .2Red : Stationary ;
  - .3Amber : Fault stop.
- .3 Unless otherwise specified, four (4) auxiliary contacts :
  - .1Two (2) normally open ;
  - . 2 Two (2) normally closed.

2.03 CONTROL TRANSFORMERS

.1 Control transformers, dry, single-phase, with primary voltage as specified and secondary voltage of 24 V, with secondary fuse, connected in circuit with starters.

.2 Power rating of control transformers determined according to control circuit load, with 20% safety margin. Power rating shall be a minimum of 100VA.

2.04 FINITION

.1 Enclosures finished to section 26 05 00.

2.05 EQUIPMENT IDENTIFICATION

.1 Equipment identified in accordance with section 26 05 00.

.2 Manual starter nameplates, size 1, with black letters engraved on white background, as indicated.

.3 Magnetic starter nameplates, size 5, with black letters engraved on white background, as indicated.

PART 3 - PERFORMANCE

3.01 INSTALLATION

.1 Install starters and control devices. Make connections to power and control circuits as indicated.

.2 Install and wire starters and controls as specified.

.3 Confirm information on motor nameplates, then make appropriate adjustments to overload protection devices.

3.02 ON-SITE QUALITY CONTROL

.1 Test in accordance with section 26 05 00.

.2 Operate switches and contactors to ensure correct operation.

.3 Perform start and stop sequences for each contactor and relay.

.4 Ensure that sequential controls, safety interlocks between associated starters, equipment and control devices operate as specified.

3.03 NETTOYAGE

.1 Clean in accordance with section 26 05 00.
.1 Remove surplus materials, waste, tools and equipment from site.

.2 Waste management: sort waste for reuse and recycling in accordance with section 26 05 00.

END OF SECTION

PART 1 - GENERAL INFORMATION

1.01 RELATED REQUIREMENTS

.1 Section 26 05 00 - Electricity - General requirements for work results

.2 Section 26 05 29 - Supports and hangers for electrical installations

.3 Section 26 05 31 - Junction, pulling and distribution boxes

.4 Section 26 05 34 - Conduits, conduit fasteners and fittings

.5 Section 26 28 23 - Fused and non-fused switches

.6 Section 26 29 10 - Starters up to 600 V

1.02 REFERENCE STANDARDS

.1 National Building Code and its supplement, most recent version.

1.03 SCOPE OF WORK

.1 Design, supply and install a complete earthquake-resistant fastening system for electrical equipment.

.2 Provide a complete and functional seismic fastening system designed by a professional engineer, licensed in a Canadian province, who is a specialist in seismic fastening system design.

.3 Seismic fastening system must be fully integrated and compatible with noise reduction requirements and anti-vibration system of mechanical equipment and related systems as specified on drawings and elsewhere.

.4 Seismic fastening system must be compatible with electrical installation and structural design of building.

.5 During or after the earthquake, fastened equipment does not necessarily have to remain in the same operating condition as in normal use. Mandatory requirements are that the seismic fastening system prevents mechanical systems and equipment from causing injury to people and prevents equipment from moving from its normal position during an earthquake.

.6 Any installed appliance suspended or removed and weighing more than 10 kg must be securely fastened in accordance with these requirements.

1.04 DOCUMENTS/SAMPLES TO BE SUBMITTED FOR INFORMATION/APPROVAL

.1 Before starting work, submit to the Consultant for information/approval, a copy of the technical execution drawings in .DWG format.

.2 Drawing and plan details shall include the following:

.1 Replacement of each seismic fastener;

.2 identification of type of earthquake-resistant fastening device;

.3 details of fastening equipment to building structure.

.3 Dearthquake-resistant fastening system calculations showing loads due to seismic forces, in accordance with the latest version of the National Building Code and its supplement, must be submitted with detailed worksheets and tables. Conservative simplifying assumptions are acceptable.

.4 Present documentation detailing installation methods for seismic-resistant fastening systems.

.5 All documents must be sealed and signed by a recognized engineer.

.6 Upon completion of construction, the Contractor shall deliver to the Consultant the complete set of original construction documents, revised to reflect as-built system conditions.

1.05 SHOP DRAWINGS

.1 Present shop drawings in accordance with specifications.

.2 Provide separate shop drawings and data sheets for each seismically-qualified fastening system and device for equipment.

PART 2 - PRODUCTS

2.01 GENERAL

.1 Seismic protection systems shall be capable of resisting forces in all directions.

.2 Fasteners and fixing points must be capable of withstanding the same loads as seismic protection devices.

.3 Seismic fasteners installed on pipe systems must be compatible with anchoring and guiding requirements for pipe systems.

.4 High-strength mechanical expansion anchors must be used to secure seismic protection devices to concrete structures. In addition, mechanical expansion anchors must be driven into new holes drilled for this purpose. The use of existing holes is prohibited. The use of nail gun anchors and fasteners is prohibited.

.1 Acceptable products: Hilti type HSL.

.5 The use of cast iron supports or supports made of threaded pipes or other brittle materials is prohibited.

.6 Seismic protection devices on piping systems and other related attachments to equipment must be compatible with anti-vibration and seismic devices for the component.

.7 Seismic protection devices must not interfere with the operation of fire stopping devices or compromise their integrity.

2.02 EARTHQUAKE-RESISTANT FASTENINGS FOR STATIC EQUIPMENT (EQUIPMENT NOT REQUIRING ANTI-VIBRATION SUPPORT)

.1 Floor-mounted equipment :

.1 Fasten hardware to brackets, which must be fastened to framing, using bolt sizes indicated on shop drawings.

.2 Hanging equipment, including piping and similar systems :

.1 Use one or more of the following methods, depending on site conditions:

.1 Fasten equipment securely to structure.

.2 Reinforce equipment in all directions.

.3 Reinforce equipment attachment points to structure.

.4 Fasten equipment with slack cables.

.3 Fixing piping with slack ropes prevents oscillation in the horizontal plane, swaying in the vertical plane and sliding and buckling in the axial direction.

.4 Precautions must be taken to ensure that suspension rods can withstand the compressive load and do not buckle.

.5 The seismic protection system shall provide a smooth and even damping effect, attributable to elastomeric material or other means, to prevent high impact loads.

.6 Acceptable suppliers of slack-wire systems: Grinnell, Korfund-Sampson, Tecoustics, Vibra-Sonic Control, Vibron.

2.03 SEISMIC FASTENERS FOR VIBRATION-ISOLATED EQUIPMENT

.1 Floor-mounted equipment :

.1 Apply one or more of the following methods, depending on site conditions:

.1 Use anti-vibration devices with integrated damping system.

.2 Use separate shock absorbers in addition to anti-vibration devices.

.3 Use a fabricated damping system consisting of structural members and an elastomeric layer, with the approval of an engineer.

.2 Seismic protection devices must not interfere in any way with soundproofing and anti-vibration systems. Allow a clearance of 4 to 8 mm, under normal operating conditions of equipment and systems, between the shock absorbers of seismic protection devices and the equipment.

.3 Incorporate seismic protection devices to prevent complete unloading of anti-vibration systems.

.4 The damping effect exerted, whether by elastomeric material or other means, must be smooth and even to prevent high impact loads.

.5 Acceptable suppliers: Korfund-Sampson, Tecoustics, Vibra-Sonic Control, Vibron.

.2 Suspended equipment, including piping, ductwork and similar systems :

.1 Use one or more of the following methods, depending on site conditions:

.1 Hold equipment with slack cables.

.2 Reinforce equipment attachment points to structure by means of anti-vibration devices with integrated dampers or additional separate dampers.

.2 Fixing piping with slack ropes prevents oscillation in the horizontal plane, swaying in the vertical plane and sliding and buckling in the axial direction.

.3 Dautions must be taken to ensure that suspension rods can withstand the compressive load and do not buckle.

.4 The seismic protection system must provide a smooth, even damping effect to prevent high impact loads.

.5 Acceptable suppliers of slack-wire systems: Grinnell, Korfund-Sampson, Tecoustics, Vibra-Sonic Control, Vibron.

PART 3 - PERFORMANCE

3.01 INSTALLATION

.1 All attachment points and fasteners must be capable of withstanding the same maximum loads as seismic protection devices in accordance with the most recent version of the National Building Code and its supplement.

.2 Attach slack-wire protection devices to ceiling-suspended equipment in such a way that the axial projection of the wires passes through the equipment's center of gravity.

.3 For piping systems, provide transverse slack rope fasteners at maximum intervals of 10 m and longitudinal slack rope fasteners at maximum intervals of 20 m, or as limited by the capacity of the anchors/sl ack ropes. Smaller pipes can be rigidly attached to larger pipes, but not vice versa.

.4 Orient the fastening cables attached to the suspended ceiling equipment so that they are at an angle of approximately 90° to each other (in the plane), then attach them to the ceiling tile so that they are at an angle of no more than 45° to it.

.5 A clearance of at least 25 mm must be provided between seismic protection devices and all other service equipment and components.

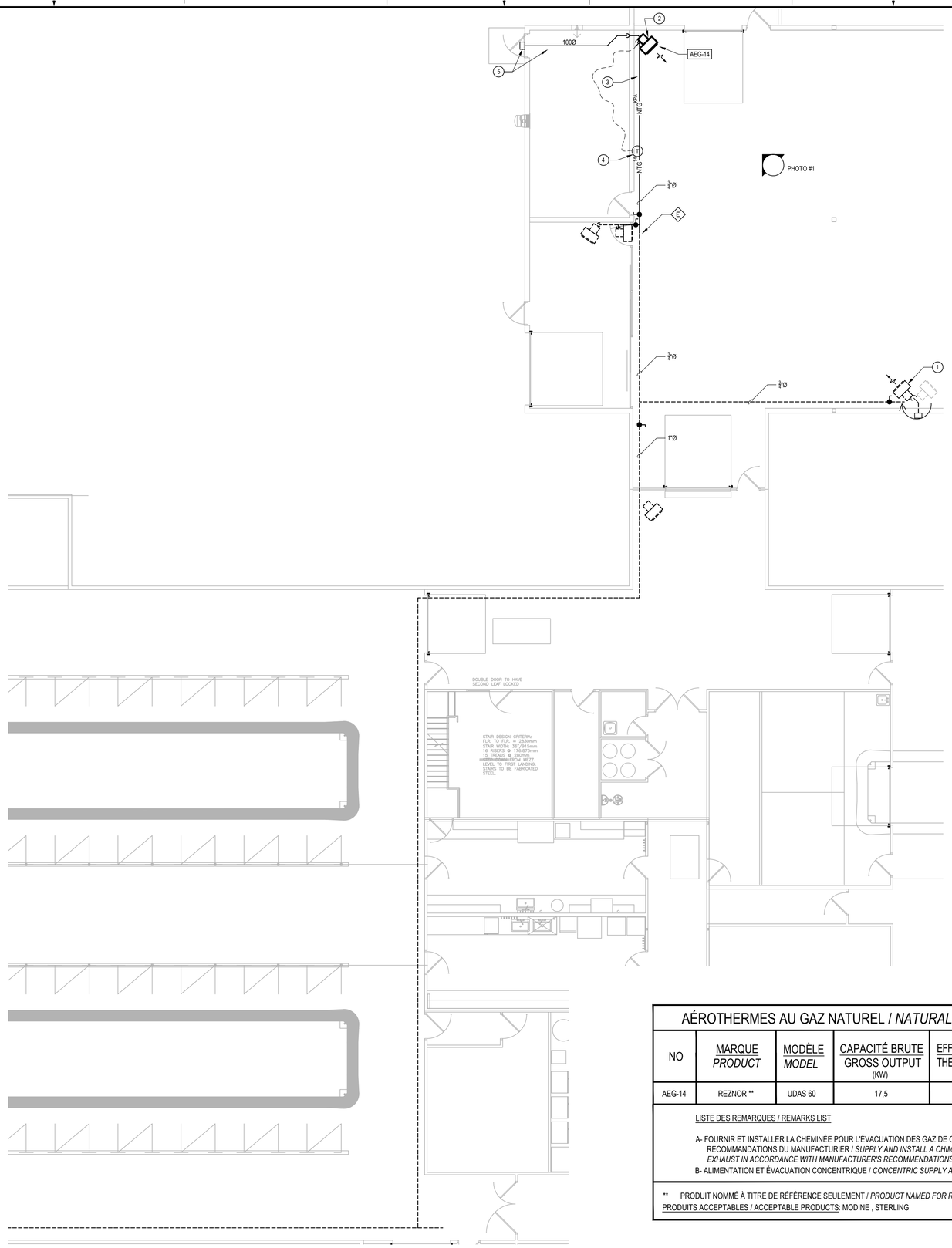
.6 Adjust the protective cables so that they allow normal operation of the anti-vibration system but are not visibly slack.

.7 Bolt to framing any miscellaneous equipment not insulated against vibration.

.8 Provide for inspection of seismic protection system by Professional Engineer. Provide written report from Professional Engineer indicating whether installation of seismic protection system is in accordance with recommendations. The report shall indicate

that the system, as installed, complies with the requirements of the National Building Code applicable to the location where it is installed.

END OF SECTION



VUE EN PLAN - CONSTRUCTION / PLAN VIEW - CONSTRUCTION

ÉCHELLE / SCALE: 1:100

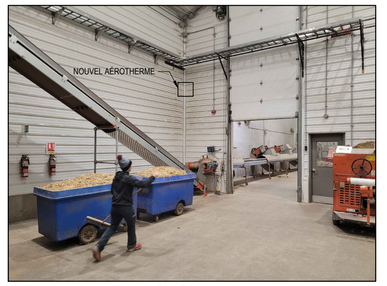
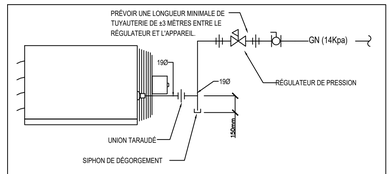
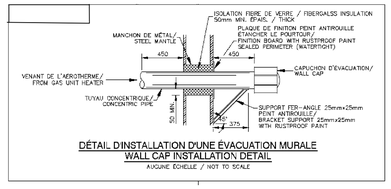


PHOTO #1



DÉTAIL DE RACCORDEMENT DE GAZ D'UN AÉROTHERME

ÉCHELLE: AUCUNE



DÉTAIL DINSTALLATION D'UNE ÉVACUATION MURALE
WALL CAP INSTALLATION DETAIL

AUCUNE ÉCHELLE / NOT TO SCALE

NO | NOTES GÉNÉRALES / *GENERAL NOTES*

VOIR LES DOCUMENTS CONTRACTUEL POUR CONNAÎTRE LES HEURES DE TRAVAUX SELON LE SECTEUR POUR L'ENSEMBLE DU PROJET / *SEE CONTRACT DOCUMENTS FOR SECTOR-SPECIFIC WORKING HOURS FOR THE ENTIRE PROJECT*

NOTES SPÉCIFIQUES / *SPECIFIC NOTES*

LA TUYAUTERIE POUR LE GAZ NATUREL DEVRA ÊTRE EN ACIER NOIR CÉDULE 40 CONFORME À LA NORME ASTM-A63/A53M OU A106. TOUTE LA TUYAUTERIE DE GAZ NATUREL SERA PEINTE AVEC 2 COUCHES DE PEINTURE ANTIROUILLE DE COULEUR JAUNE / *NATURAL GAS PIPING SHALL BE BLACK SCHEDULE 40 STEEL CONFORMING TO ASTM-A63/A53M OR A106. ALL NATURAL GAS PIPING SHALL BE PAINTED WITH 2 COATS OF YELLOW ANTI-RUST PAINT.*

ÉVACUATION DES GAZ DE COMBUSTION / *FLUE GAS EVACUATION:*

- LES CONDUITS DE SIMPLE PAROI SERONT EN ACIER GALVANISÉ DE CALIBRE 24 OU PLUS. LES JOINTS SERONT ÉTANCHES ET SCELLÉS À L'AIDE D'UN SCELLANT DE SILICONE ET D'UN RUBAN D'ALUMINIUM / *SINGLE-WALL DUCTS WILL BE MADE OF 24-GAUGE GALVANIZED STEEL OR HEAVIER. JOINTS WILL BE WATERTIGHT AND SEALED WITH SILICONE SEALANT AND ALUMINUM TAPE.*
- LES CONDUITS DOUBLE PAROIS DE TYPE "B-VENT" EN ACIER GALVANISÉ DE MÊME CALIBRE QUE LA TUYAUTERIE ET HOMOLOGUÉS. LES JOINTS SERONT ÉTANCHES ET SCELLÉS À L'AIDE D'UN SCELLANT ET DE SILICONE. LE TOUT EN CONFORMITÉ AVEC LES RECOMMANDATIONS DU MANUFACTURIER DU CONDUIT HOMOLOGUÉ. / *"B-VENT" TYPE DOUBLE-WALL GALVANIZED STEEL DUCTS OF THE SAME CALIBRE AS THE PIPING AND APPROVED. JOINTS MUST BE WATERTIGHT AND SEALED WITH SEALANT AND SILICONE. ALL IN COMPLIANCE WITH THE APPROVED DUCT MANUFACTURER'S RECOMMENDATIONS.*

TOUTE LA TUYAUTERIE SERA NETTOYÉE ET LAVÉE APRÈS L'INSTALLATION DE FAÇON À ENLEVER TOUT DÉPÔT OU SALETÉ QUI PEUT ÊTRE DEMEURÉ DANS LES TUYAUX / *ALL PIPING MUST BE CLEANED AND WASHED AFTER INSTALLATION TO REMOVE ANY DEPOSITS OR DIRT THAT MAY HAVE REMAINED IN THE PIPES.*

LORSQU'UN ÉVENT TRAVERSE LE TOIT, FOURNIR ET INSTALLER UN SOLIN EN "ABS" POUR COUVRIR LA SORTIE DE L'ÉVENT AU TOIT / *WHERE A VENT PASSES THROUGH THE ROOF, SUPPLY AND INSTALL AN "ABS" FLASHING TO COVER THE VENT OUTLET ON THE ROOF.*

NO | NOTES (FRANÇAIS / *ENGLISH*)

1. AÉROTHERME AU GAZ NATUREL EXISTANT D'UNE CAPACITÉ DE 17,5 KW À TOURNER DE +/- 90° TEL QUE MONTRÉ AU PLAN. PRÉVOIR LES INTERVENTIONS REQUISES POUR MODIFIER LA TUYAUTERIE D'ALIMENTATION DE GAZ ET DES ÉVENTS / *EXISTING 17.5 KW NATURAL GAS UNIT HEATER TO BE TURNED +/- 90° AS SHOWN ON PLAN. PLAN THE WORK REQUIRED TO MODIFY THE GAS SUPPLY PIPING AND VENTS.*
2. FOURNIR ET INSTALLER UN NOUVEL AÉROTHERME AU GAZ NATUREL C/A SUPPORTS. VOIR LE TABLEAU POUR LE SPÉCIFICATIONS. FAIRE L'INSTALLATION ET LE RACCORDEMENT DE LA TUYAUTERIE D'ALIMENTATION EN GAZ, LES ACCESSOIRES ET L'ÉVENT DES GAZ DE COMBUSTION SELON LES RECOMMANDATIONS DU MANUFACTURIER ET LES NORMES EN VIGUEUR / *SUPPLY AND INSTALL A NEW NATURAL GAS UNIT HEATER C/A SUPPORTS. SEE TABLE FOR SPECIFICATIONS. INSTALL AND CONNECT GAS SUPPLY PIPING AND FLUE GAS VENTING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND APPLICABLE STANDARDS.*
3. FOURNIR ET INSTALLER UN RÉGULATEUR DE PRESSION SANS ÉVENT TEL QUE LA MARQUE "MAXITROL", MODÈLE "MAX-325-5L-3/4-8.0" OU ÉQUIVALENT APPROUVÉ, DE 19mm DE DIAMÈTRE / *SUPPLY AND INSTALL A "MAXITROL" BRAND VENTLESS PRESSURE REGULATOR, MODEL "MAX-325-5L-3/4-8.0", ¾" DIAMETER.*
4. THERMOSTAT DE PIÈCE (24V), FOURNI AVEC L'AÉROTHERME MAIS INSTALLÉ ET RACCORDÉ PAR LA DIVISION 26 / *ROOM THERMOSTAT (24V), SUPPLIED WITH THE HEATER BUT INSTALLED AND CONNECTED BY DIVISION 26.*
5. FOURNIR ET INSTALLER LA CHEMINÉE DOUBLE-PAROI ET LE CAPUCHON D'ÉVACUATION SELON LES NOTES GÉNÉRALES AU PLAN ET LES RECOMMANDATIONS DU MANUFACTURIER. LA CHEMINÉE DOIT ÊTRE EN PENTE VERS L'EXTÉRIEUR. VOIR LE TABLEAU DES AÉROTHERMES ET LE DÉTAIL D'INSTALLATION. COORDONNER LE PASSAGE FINAL AU CHANTIER / *SUPPLY AND INSTALL BI-VENT CHIMNEY AND FLUE CAP ACCORDING TO GENERAL NOTES ON PLAN AND MANUFACTURER'S RECOMMENDATIONS. THE CHIMNEY MUST SLOPE OUTWARDS. SEE UNIT HEATER TABLE AND INSTALLATION DETAILS. COORDINATE THE FINAL PASS TO THE JOB SITE.*

LÉGENDE DE PLOMBERIE ET GAZ / *PLUMBING AND GAZ LEGEND*

- NTG (KPA) — TUYAUTERIE DE GAZ NATUREL / *NATURAL GAS PIPING*
- NTG - - - TUYAUTERIE DE GAZ NATUREL EXISTANTE / EXISTING NATURAL GAS PIPING
- ROBINET À BILLE / BALL VALVE
- RÉGULATEUR DE PRESSION / *PRESSURE REGULATOR*
- ROBINET DE CONTRÔLE À 2 VOIES / 2-WAY CONTROL VALVE
- 3/4 — DIAMÈTRE NOMIAL (DN) EN POUCE / NOMINAL DIAMETER IN INCHES
- ROBINET À BOISSEAU LUBRIFIÉ / LUBRFICATED PLUG VALVE
- (E) — RACCORDEMENT À L'EXISTANT / *CONNECTION TO EXISTING*

AÉROTHERMES AU GAZ NATUREL / *NATURAL GAS UNIT HEATER*

NO	MARQUE *PRODUCT*	MODÈLE *MODEL*	CAPACITÉ BRUTE GROSS OUTPUT (KW)	EFFICACITÉ THERMIQUE THERMAL EFFICIENCY (%)	DIAMÈTRE RACCORDEMENT GAZ GAZ CONNECTION	DIAMÈTRE ÉVENT VENT CONNECTION DIA.	MOTEUR / MOTOR FLA	MOTEUR / MOTOR ALIM. (VOLTS/Ø) ELEC.SUPPLY	REMARQUES REMARKS (VOIR LISTE CI-BAS) (SEE LIST BELOW)
AEG-14	REZNOR **	UDAS 60	17,5	83	¾"Ø	4"Ø	2,4	115-1	A, B, C, D

LISTE DES REMARQUES / REMARKS LIST

A- FOURNIR ET INSTALLER LA CHEMINÉE POUR L'ÉVACUATION DES GAZ DE COMBUSTION SELON LES RECOMMANDATIONS DU MANUFACTURIER / *SUPPLY AND INSTALL A CHIMNEY FOR COMBUSTION GAS EXHAUST IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS*

B- ALIMENTATION ET ÉVACUATION CONCENTRIQUE / *CONCENTRIC SUPPLY AND EXHAUST*

C- SECTIONNEUR INTÉGRÉ À L'ÉQUIPEMENT / BUILT-IN DISCONNECT SWITCH

D- THERMOSTAT 24V (UN STAGE) / *SINGLE-STAGE THERMOSTAT (24V)*

** PRODUIT NOMMÉ À TITRE DE RÉFÉRENCE SEULEMENT / *PRODUCT NAMED FOR REFERENCE ONLY*

PRODUITS ACCEPTABLES / ACCEPTABLE PRODUCTS: MODINE , STERLING

THIS DOCUMENT SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES (OR MANUFACTURING, OR INSTALLATION)

CE DOCUMENT NE DOIT PAS ÊTRE UTILISÉ À DES FINS DE CONSTRUCTION (OU DE FABRICATION, OU D'INSTALLATION)

wsp
1135, BOULEVARD LEBOURGNEUF
QUÉBEC (QUÉBEC) CANADA G2K 0M5
TÉL. : 418 623-2254 | TÉLÉC. : 418 624-1857 | WWW.WSP.COM

CONSULTANT - SOUS-CONSULTANT / CONSULTANT - SUB-CONSULTANT:

SCEAU / SEAL:

INGÉNIEUR Francis Boucher 5048180 QUÉBEC
2024-02-02

CLIENT / CLIENT:

Agriculture et Agroalimentaire Canada | Agriculture and Agri-Food Canada

Canada

CENTRE DE RECHERCHE ET DE DÉVELOPPEMENT DE SHERBROOKE

RÉF. CLIENT / CLIENT REF. #: --

PROJET / PROJECT:

CORRECTIFS DU DÉPOUSSIÉRAGE DES AIRES DE PRÉPARATION AU COMPLEXE LAITIER (BATIMENT #76) 2000, RUE COLLÈGE, SHERBROOKE, QC, J1M 0C8

PLAN CLÉ / KEY PLAN:

ÉMISSION - RÉVISION / ISSUED FOR - REVISION:

ÉM./IS.	RV./RV.	DATE / DATE	DESCRIPTION / DESCRIPTION
00		2024-02-02	SOUMISSION / FOR TENDER

NO PROJET / PROJECT NO: CA0015250.5522	DATE / DATE: 2024-02-02
ÉCHELLE ORIGINALE / ORIGINAL SCALE: AU PLAN	SI CETTE BARRE NE MESURE PAS 25 mm, AJUSTER VOTRE ÉCHELLE DE TRAÇAGE. IF THIS BAR IS NOT 25 mm LONG, ADJUST YOUR PLOTTING SCALE. 25 mm
CONÇU PAR / DESIGNED BY: FRANCIS BOUCHER, ING.	
DESSINÉ PAR / DRAWN BY: CHRISTIAN CORRIVEAU, TECH.	
VÉRIFIÉ PAR / CHECKED BY: FRANCIS BOUCHER, ING.	

DISCIPLINE / DISCIPLINE:

BÂTIMENT: PLOMBERIE

TITRE / TITLE:

ALIMENTATION GAZ NATUREL CONSTRUCTION

NUMÉRO DU FEUILLET / SHEET NUMBER:

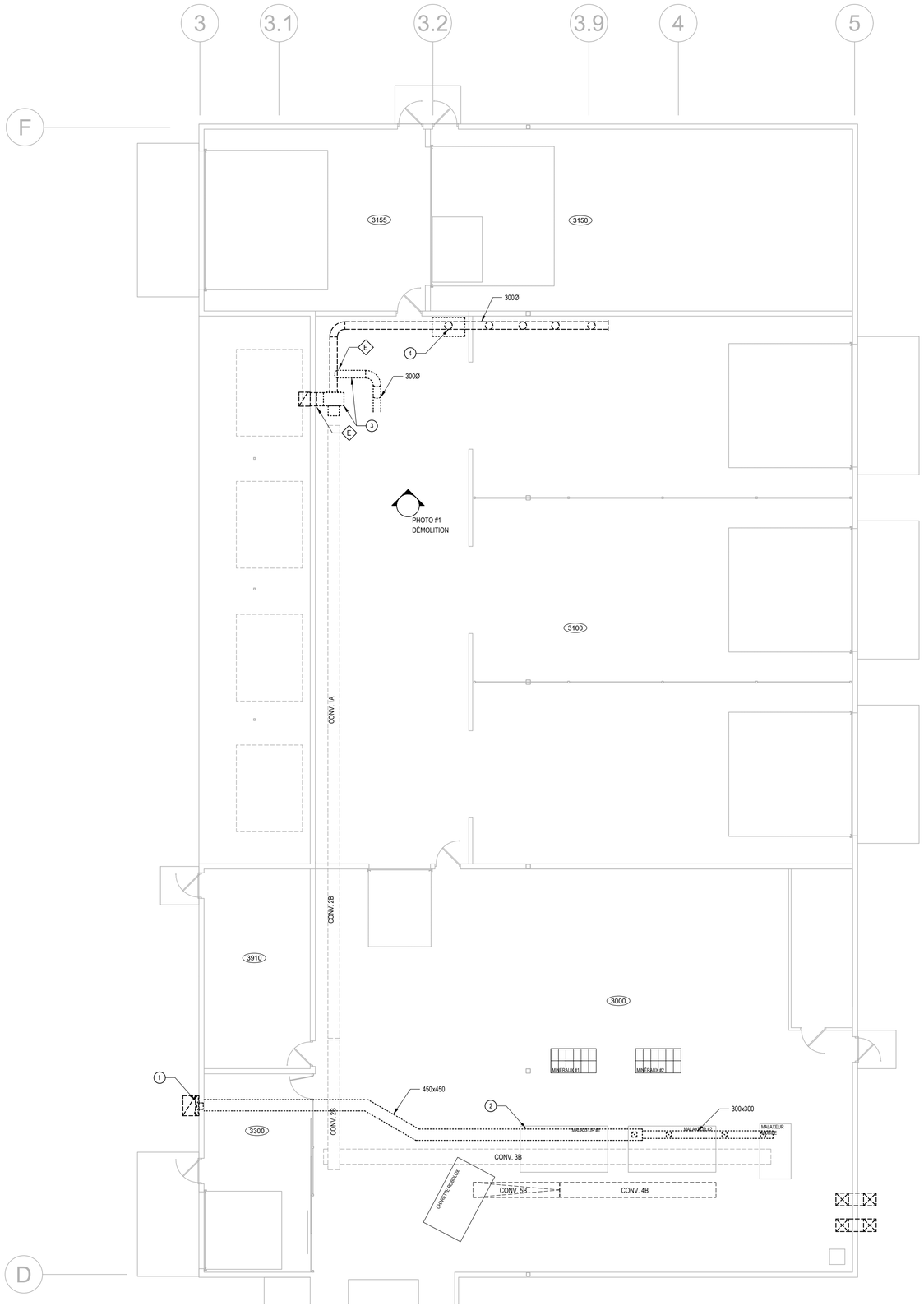
P01

FEUILLET # / SHEET #: 1 DE / OF 1

ÉMISSION / ISSUE: **SOUMISSION / FOR TENDER**

EN DATE DU / DATE OF: **2024-02-02**

RV./RV. #: **0**



VUE EN PLAN - DÉMANTÈLEMENT / PLAN VIEW - DEMOLITION

ÉCHELLE / SCALE: 1:100

PHOTO #1- DÉMOLITION / DEMOLITION

NO	NOTES GÉNÉRALES / *GENERAL NOTES*
	VOIR LES DOCUMENTS CONTRACTUEL POUR CONNAÎTRE LES HEURES DE TRAVAUX SELON LE SECTEUR POUR L'ENSEMBLE DU PROJET / *SEE CONTRACT DOCUMENTS FOR SECTOR-SPECIFIC WORKING HOURS FOR THE ENTIRE PROJECT*

NO	NOTES (FRANÇAIS / *ENGLISH*)
1	VENTILATEUR EXISTANT ET LE CAPOTIN MURAL EXTÉRIEUR À DÉMANTELER/ *EXISTING FAN AND EXTERNAL WALL COWL TO BE DISMANTLED.*
2	CONDUIT D'ÉVACUATION EXISTANT EN PVC À DÉMANTELER AU COMPLET INCLUANT LES RACCORDS DE CAPTATION ET LES SUPPORTS. VOIR LA PHOTO #1 AU PLAN V02 / *EXISTING PVC DUCTWORK TO BE COMPLETELY DISMANTLED INCLUDING CAPTURE CONNECTORS AND BRACKETS. SEE PICTURE #1 ON PLAN V02.*
3	VENTILATEUR EXISTANT ET SECTION DE CONDUIT À DÉMANTELER. BOUCHER ET ÉTANCHER L'OUVERTURE SUR LE CONDUIT PRINCIPAL AVEC UNE TÔLE EN ACIER GALVANISÉ DE CALIBRE 20 (MINIMUM). / *EXISTING FAN AND DUCT SECTION TO BE DISMANTLED. PLUG AND SEAL THE MAIN DUCT OPENING WITH 20-GAUGE GALVANIZED STEEL SHEET (MINIMUM).*
4	HOTTE DE CAPTATION EXISTANTE ET CONDUIT INCLUANT LE VOLET MOTORISÉ À DÉMANTELER. BOUCHER ET ÉTANCHER L'EXTRÉMITÉ DU CONDUIT DE 300Ø. VOIR LA PHOTO #1 / *EXISTING CAPTURE HOOD AND DUCT INCLUDING MOTORIZED DAMPER TO BE DISMANTLED. PLUG AND SEAL THE END OF THE 300Ø DUCT. SEE PHOTO #1*

LÉGENDE DE VENTILATION

- NOUVEAU CONDUIT OU ÉQUIPEMENT
- MONTÉE D'UN CONDUIT D'ALIMENTATION D'AIR
- DESCENTE D'UN CONDUIT D'ALIMENTATION D'AIR
- MONTÉE D'UN CONDUIT D'ÉVACUATION OU DE REPRISE D'AIR
- DESCENTE D'UN CONDUIT D'ÉVACUATION OU DE REPRISE D'AIR
- CONDUIT OU ÉQUIPEMENT EXISTANT À CONSERVER (OU NOUVEAU CONDUIT OU ÉQUIPEMENT DISSIMULÉ)
- CONDUIT OU ÉQUIPEMENT EXISTANT À ENLEVER ET À RETIRER DES LIEUX (SAUF SI INDIQUÉ AUTREMENT)
- E.B. — CHANGEMENT DE NIVEAU EN PLAN (OFFSET) EN BAS
- E.H. — CHANGEMENT DE NIVEAU (OFFSET) EN HAUT
- TRANSFORMATION DE ROND À CARRÉ OU À RECTANGULAIRE
- M — REGISTRE MOTORISÉ
- RACCORD SOUPLE "DURO-DYNE" DU TYPE "NÉOPRÈNE", MIN. 150mm (6po) DE LONG AVEC RACCORD "GRIP-LOC", OU ÉQUIVALENT APPROUVÉ
- CONDUIT D'AIR SOUPLE, VOIR DEVIS
- P.A.N. — PRISE D'AIR NEUF
- S.A.V. — SORTIE D'AIR VICIÉ
- E — POINT DE RACCORDEMENT D'UN NOUVEAU CONDUIT OU ÉQUIPEMENT À UN CONDUIT OU ÉQUIPEMENT EXISTANT
- NUMÉRO DE RÉFÉRENCE EN PLAN
- T.A. — TRAPPE D'ACCÈS
- DESCRIPTION DE L'ÉQUIPEMENT DÉCRIT AU TABLEAU

N1 = SYMBOLE / MODÈLE / TYPE (VOIR TABLEAU DES GRILLES ET DIFFUSEURS)
EX: 450x450 = DIMENSIONS
N1 450x450 / 4V 400
400 = DÉBIT D'AIR (L/S)
QUANTITÉ

wsp
1135, BOULEVARD LEBOURGNEUF
QUÉBEC (QUÉBEC) CANADA G2K 0M5
TÉL. : 418 623-2254 | TÉLÉC. : 418 624-1857 | WWW.WSP.COM

CONSULTANT - SOUS-CONSULTANT / CONSULTANT - SUB-CONSULTANT:

SCEAU / SEAL:

INGÉNIEUR Francis Boucher 5048160 QUÉBEC
2024-02-02

CLIENT / CLIENT:

Agriculture et Agroalimentaire Canada / Agriculture and Agri-Food Canada
Canada

CENTRE DE RECHERCHE ET DE DÉVELOPPEMENT DE SHERBROOKE

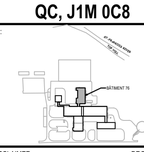
RÉF. CLIENT / CLIENT REF. #: --

PROJET / PROJECT:

CORRECTIFS DU DÉPOUSSIÉRAGE DES AIRES DE PRÉPARATION AU COMPLEXE LAITIER (BATIMENT #76)

2000, RUE COLLÈGE, SHERBROOKE, QC, J1M 0C8

PLAN CLÉ / KEY PLAN:



ÉMISSION - RÉVISION / ISSUED FOR - REVISION:

ÉM./IS.	RV./RV.	DATE / DATE	DESCRIPTION / DESCRIPTION
00		2024-02-02	SOUMISSION / FOR TENDER

NO PROJET / PROJECT NO: CA0015250.5522
DATE / DATE: 2024-02-02
ÉCHELLE ORIGINALE / ORIGINAL SCALE: AU PLAN
CONÇU PAR / DESIGNED BY: FRANCIS BOUCHER, ING.
DESSINÉ PAR / DRAWN BY: CHRISTIAN CORRIVEAU, TECH.
VÉRIFIÉ PAR / CHECKED BY: FRANCIS BOUCHER, ING.

SI CETTE BARRE NE MESURE PAS 25 mm, AJUSTER VOTRE ÉCHELLE DE TRAÇAGE.
IF THIS BAR IS NOT 25 mm LONG, ADJUST YOUR PLOTTING SCALE.
25 mm

DISCIPLINE / DISCIPLINE: **BÂTIMENT: VENTILATION**

TITRE / TITLE:

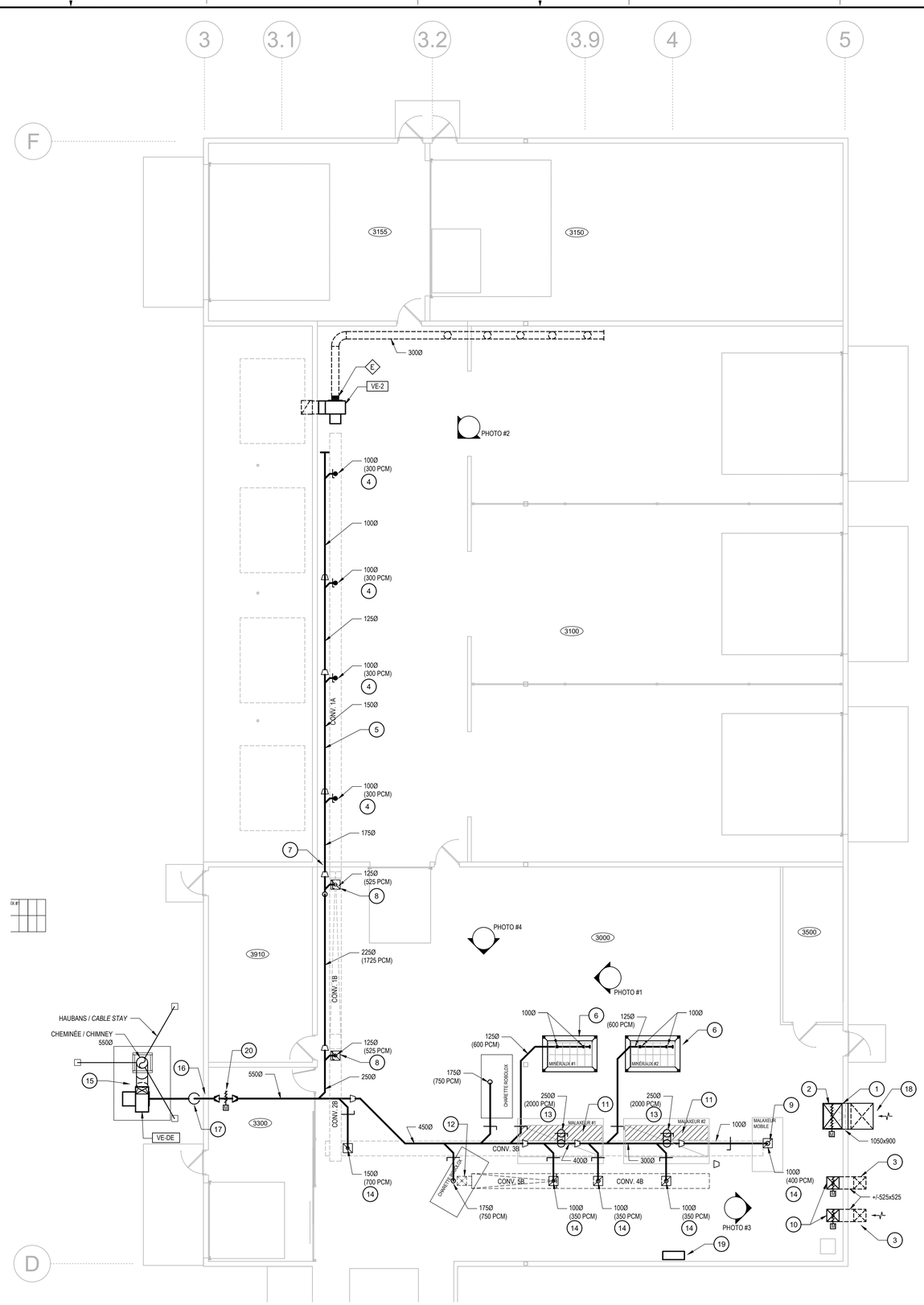
VENTILATION - DÉMOLITION ET LÉGENDE

NUMÉRO DU FEUILLET / SHEET NUMBER: **V01**

FEUILLET # / SHEET #: 1 DE / OF 3

ÉMISSION / ISSUE: **SOUMISSION / FOR TENDER** — # RV./RV.: 0

EN DATE DU / DATE OF: **2024-02-02**



VUE EN PLAN - CONSTRUCTION / PLAN VIEW - CONSTRUCTION

ÉCHELLE / SCALE: 1:100

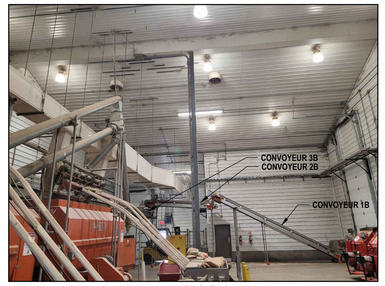


PHOTO #1

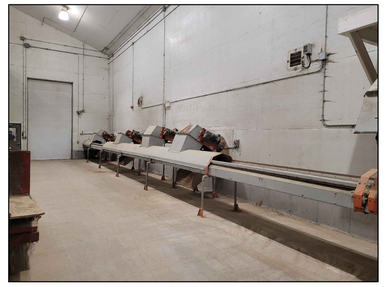
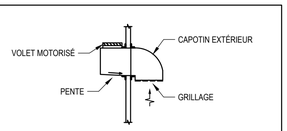


PHOTO #2

PHOTO #3

PHOTO #4



CAPOTIN AIR FRAIS (ITEM 17)
FRESH AIR INTAKE (ITEM 17)

NO | NOTES GÉNÉRALES / *GENERAL NOTES*

VOIR LES DOCUMENTS CONTRACTUEL POUR CONNAÎTRE LES HEURES DE TRAVAUX SELON LE SECTEUR POUR L'ENSEMBLE DU PROJET / *SEE CONTRACT DOCUMENTS FOR SECTOR-SPECIFIC WORKING HOURS FOR THE ENTIRE PROJECT*

TOUS LES CONDUITS RONDS MONTRÉS AU PLAN SERONT DE TYPE 'SPIRAL' RESPECTANT LES EXIGENCES DU TABLEAU DES CONDUITS D'AIR ET DU DEVIS / *ALL ROUND DUCTS SHOWN ON THE PLAN WILL BE OF THE 'SPIRAL' TYPE, COMPLYING WITH THE REQUIREMENTS OF THE AIR DUCT TABLE AND SPECIFICATIONS*

NO | NOTES (FRANÇAIS / *ENGLISH*)

1. PLÉNUM DE 1050x900 EN ACIER GALVANISÉ DE CALIBRE 18 ENTIÈREMENT SOUDÉ AVEC FOND EN PENTE VERS L'EXTÉRIEUR / *1050X900 18 GAUGE GALVANIZED STEEL PLENUM FULLY WELDED WITH OUTDOOR-ORIENTED SLOPE BOTTOM.*
2. OUVERTURE SUR LE DESSUS DU PLÉNUM, LONGUEUR DE CONDUIT DE 1000x700 DE 200mm DE LONG C/A VOLET MOTORISÉ ISOLÉ AVEC CADRE À BRIDES ET LAMES PARALLÈLES, TEL QUE "*TAMCO, SÉRIE 9000-BF*" / *OPENING ON THE TOP OF THE PLENUM. 1000X700 DUCT OF 200MM LONG C/W INSULATED MOTORIZED DAMPER WITH FLANGED FRAME AND PARALLEL BLADES SUCH AS "TAMCO, 9000-BF SERIES"*
3. CAPOTIN D'ENTRÉE D'AIR EXISTANT / *EXISTING AIR INTAKE COWL*
4. CONDUIT À RACCORDER SUR LE COUVERT DE TÔLE DU CONVOYEUR / DUCTWORK TO BE CONNECTED TO CONVEYOR COVER PLATE
5. CONDUIT DE VENTILATION INSTALLÉ À +/- 600mm AU-DESSUS DU CONVOYEUR SUR DES SUPPORTS MURAUX FIXÉS AU MUR / *DUCTWORK INSTALLED +/- 600mm ABOVE CONVEYOR ON WALL-MOUNTED BRACKETS*
6. HOTTE DE CAPTATION EN ACIER GALVANISÉ DE CALIBRE 20 INSTALLÉE À UNE HAUTEUR DE +- 1500mm DU PLANCHER. LA HOTTE EST SOUTENUE PAR DES PATTES VISSÉES AU PLANCHER. VOIR LE DÉTAIL / *20 GAUGE GALVANIZED STEEL FUME HOOD INSTALLED AT A HEIGHT OF +/- 1500mm FROM THE FLOOR. THE HOOD IS SUPPORTED BY BRACKETS SCREWED TO THE FLOOR. SEE DETAILS.*
7. PRÉVOIR UNE OUVERTURE AU MUR EXISTANT POUR L'INSTALLATION DU CONDUIT DE VENTILATION. ÉTANCHER AUTOUR DE L'OUVERTURE LORSQUE LE CONDUIT SERA INSTALLÉ / *PROVIDE AN OPENING IN THE EXISTING WALL FOR THE INSTALLATION OF THE VENTILATION DUCT. SEAL AROUND THE OPENING WHEN THE DUCT IS INSTALLED*
8. CONDUIT COMPLET AVEC UNE BUSE DE CAPTATION À INSTALLER À ENVIRON 200mm AU-DESSUS DU CONVOYEUR À LA DÉCHARGER ENTRE LES DEUX CONVOYEURS. VOIR LE DÉTAIL DE LA BUSE DE CAPTATION / *DUCT WITH COLLECTION NOZZLE TO BE INSTALLED APPROXIMATELY 200mm ABOVE CONVEYOR AT DISCHARGED BETWEEN THE TWO CONVEYORS. SEE NOZZLE DETAIL.*
9. CONDUIT À DESCENDRE À PROXIMITÉ DE LA DÉCHARGE DU CONVOYEUR. FOURNIR ET INSTALLER UNE BUSE DE CAPTATION (VOIR DÉTAIL) À L'EXTRÉMITÉ À ENVIRON 200mm AU-DESSUS DU MALAXEUR MOBILE / *DUCT TO BE LOWERED CLOSE TO THE CONVEYOR DISCHARGE. SUPPLY AND INSTALL A CAPTATION NOZZLE (SEE DETAIL) AT THE EXTREMITY APPROXIMATELY 200mm ABOVE THE MOBILE MALAXER.*
10. PROLONGER LES CONDUIT D'ENTRÉE D'AIR FRAIS LE LONG DU MUR JUSQU'À 500mm DU TOIT. DIMENSIONS DE +/- 525x525 À VALIDER AU CHANTIER. FOURNIR ET INSTALLER À L'EXTRÉMITÉ DES CONDUITS UN GRILLAGE À MAILLER EN FIL ACIER GALVANISÉ DE 13mm x 13mm À JOINTS SOUDÉS ET DE CALIBRE 16. / *EXTEND FRESH AIR INTAKE DUCTWORK ALONG THE WALL UP TO 500mm FROM THE ROOF. DIMENSIONS OF +/- 525X525 TO BE VALIDATED AT SITE. SUPPLY AND INSTALL A 13MM X 13MM WELDED STAINLESS STEEL WIRE MESH GRILL 16 GAUGE AT THE OUTSIDE OF THE PIPE.*
11. FOURNIR ET INSTALLER DES TÔLES EN ACIER GALVANISÉ (24G MIN.) DÉMONTABLES TEL QUE LA SURFACE MONTRÉE AU PLAN AFIN DE LIMITER L'OUVERTURE LIBRE AU-DESSUS DU MALAXEUR. PRENDRE LES MESURES ET CONSIDÉRER LES OBSTACLES (TUYAUX) AU CHANTIER / *SUPPLY AND INSTALL REMOVABLE GALVANIZED STEEL SHEETS (24G MIN.) AS SHOWN ON THE PLAN TO LIMIT THE FREE OPENING ABOVE THE MIXER. TAKE MEASUREMENTS AND CONSIDER OBSTACLES (PIPES) ON SITE.*
12. PROLONGER LE CONDUIT À PARTIR DE L'OUVERTURE DE LA DÉCHARGE DU CONVOYEUR VERS LA CHARETTE ROBOLOX À L'AIDE DE FEUILLE DE POLYCARBONATE TRANSPARENTE (TEL QUE LA MARQUE "LEXAN") JUSQU'À 200mm AU-DESSUS DE LA CHARETTE. DIMENSIONS +/-300x300. VOIR LA PHOTO #4 / *EXTEND DUCTWORK FROM THE CONVEYOR DISCHARGE OPENING TO THE ROBOLOX CHARTER WITH TRANSPARENT POLYCARBONATE SHEET (SUCH AS "LEXAN" BRAND) UP TO 200mm ABOVE THE CHARTER. DIMENSIONS +/- 300x300. SEE PHOTO #4.*
13. CONDUIT À DESCENDRE JUSQU'AU COUVERCLE DE TÔLE. FAIRE UNE OUVERTURE DU DIAMÈTRE DU CONDUIT DANS LA TÔLE. LES TRAVAUX DOIVENT ÊTRE FAITS DE MANIÈRE À CE QUE LES TÔLES DE RECOUVREMENT PUISSENT ÊTRE RETIRÉES POUR LE NETTOYAGE ET L'ENTRETIEN / *DUCT DOWN TO THE SHEET METAL COVER. MAKE AN OPENING IN THE SHEET METAL THE SAME DIAMETER AS THE CONDUIT. WORK MUST BE CARRIED OUT IN SUCH A WAY THAT THE COVER PLATES CAN BE REMOVED FOR CLEANING AND MAINTENANCE.*
14. CONDUIT À DESCENDRE JUSQU' AU-DESSUS DU CONVOYEUR. FOURNIR ET INSTALLER UNE BUSE DE CAPTATION (VOIR DÉTAIL) À L'EXTRÉMITÉ À ENVIRON 200MM AU-DESSUS DU CONVOYEUR / *DUCT TO BE LOWERED TO THE TOP OF THE CONVEYOR. SUPPLY AND INSTALL A NOZZLE (SEE DETAIL) AT THE END ABOUT 200mm ABOVE THE CONVEYOR.*
15. VENTILATEUR, CONDUIT, CHEMINÉE ET SUPPORT. VOIR LE DÉTAIL D'INSTALLATION. / *FAN, DUCT, CHIMNEY AND SUPPORT. SEE INSTALLATION DETAILS.*
16. OUVERTURE EXISTANTE À AGRANDIR PUR LE PASSAGE DE LA NOUVELLE GAINE. SUITE À L'INSTALLATION, FAIRE LE RAGRÉAGE DU MUR ET ÉTANCHER AUTOUR DE LA GAINE. LE CALORIFUGE DU CONDUIT D'ÉVACUATION DOIT ÊTRE FAIT JUSQU'À L'ISOLANT DE MUR. EXISTING OPENING TO BE ENLARGED TO ACCOMMODATE NEW DUCT. AFTER INSTALLATION, LEVEL THE WALL AND SEAL AROUND THE DUCT. INSULATE THE EXHAUST DUCT UP TO THE WALL INSULATION.
17. CONDUIT À INSTALLER LE LONG DU BÂTIMENT JUSQU'À +/- 450mm DU SOL. À VALIDER AU CHANTIER / DUCTWORK TO BE INSTALLED ALONG THE BUILDING UP TO +/- 450MM FROM THE GROUND. TO BE VALIDATED ON SITE.
18. CAPOTIN D'ENTRÉE D'AIR EXTÉRIEUR DE 1050x900 EN ACIER GALVANISÉ DE CALIBRE 18, ENTIÈREMENT SOUDÉ. FOURNIR ET INSTALLER UN GRILLAGE À MAILLE DE 13mm X 13mm. VOIR LE DÉTAIL. SCELLER ET ÉTANCHER LE TOUR DE L'OUVERTURE. FAIRE LE RAGRÉAGE DU REQUIS AU BESOIN / *OUTDOOR AIR INTAKE WALL-MOUNTED HOOD, 1050X900, 18 GAUGE GALVANIZED STEEL, WELDED ENTRY. SUPPLY AND INSTALL 13MM X 13MM MESH GRILL. SEE DETAIL. SEAL AROUND OPENING. PATCH AS REQUIRED.*
19. PANNEAU DE CONTRÔLE / CONTROL PANNEL
20. VOLET MOTORISÉ ISOLÉ AVEC CADRE À BRIDES ET LAMES PARALLÈLES, TEL QUE "TAMCO, SÉRIE 9000-BF", DIMENSIONS DE 550x550. PRODUITS ACCEPTABLES: TROLEC, RUSKIN. / *INSULATED MOTORIZED DAMPER WITH FLANGED FRAME AND PARALLEL BLADES SUCH AS "TAMCO, 9000-BF SERIES". ACCEPTABLE PRODUCTS: TROLEC, RUSKIN.*

THIS DOCUMENT SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES (OR MANUFACTURING, OR INSTALLATION)

CE DOCUMENT NE DOIT PAS ÊTRE UTILISÉ À DES FINS DE CONSTRUCTION (OU DE FABRICATION, OU D'INSTALLATION)

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CONSULTANT - SOUS-CONSULTANT / CONSULTANT - SUB-CONSULTANT:

SCEAU / SEAL:

INGÉNIEUR Francis Boucher 5048160 Québec
2024-02-02

CLIENT / CLIENT:

Agriculture et Agroalimentaire Canada | Agriculture and Agri-Food Canada

Canada

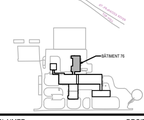
CENTRE DE RECHERCHE ET DE DÉVELOPPEMENT DE SHERBROOKE

RÉF. CLIENT / CLIENT REF. #: --

PROJET / PROJECT:

CORRECTIFS DU DÉPOUSSIÉRAGE DES AIRES DE PRÉPARATION AU COMPLEXE LAITIER (BATIMENT #76)
2000, RUE COLLÈGE, SHERBROOKE, QC, J1M 0C8

PLAN CLÉ / KEY PLAN:



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ÉM./IS.	RV./RV.	DATE / DATE	DESCRIPTION / DESCRIPTION
00		2024-02-02	SOUMISSION / FOR TENDER

NO PROJET / PROJECT NO: CA0015250.5522

DATE / DATE: 2024-02-02

ÉCHELLE ORIGINALE / ORIGINAL SCALE: AU PLAN

SI CETTE BARRE NE MESURE PAS 25 mm, AJUSTER VOTRE ÉCHELLE DE TRAÇAGE.
IF THIS BAR IS NOT 25 mm LONG, ADJUST YOUR PLOTTING SCALE.
25 mm

CONÇU PAR / DESIGNED BY: FRANCIS BOUCHER, ING.

DESSINÉ PAR / DRAWN BY: CHRISTIAN CORRIVEAU, TECH.

VÉRIFIÉ PAR / CHECKED BY: FRANCIS BOUCHER, ING.

DISCIPLINE / DISCIPLINE:
BÂTIMENT: VENTILATION

TITRE / TITLE:
VENTILATION - CONSTRUCTION

NUMÉRO DU FEUILLET / SHEET NUMBER:
V02

FEUILLET # / SHEET #: 2 DE / OF 3

ÉMISSION / ISSUE: **SOUMISSION / FOR TENDER**

RV./RV. #: **0**

EN DATE DU / DATE OF: **2024-02-02**

VENTILATEURS / FANS

NO	USAGE / *USE*	MARQUE / *PRODUCT*	MODÈLE / *MODEL*	DÉBIT D'AIR / AIR FLOW (L/S)	PRESS. STA. / STA. PRESS. (Pa)	ROUE / WHEEL DIA. ET TYPE / DIA AND TYPE	T.P.M. / R.P.M.	ROTATION	ORIENTATION	NIVEAU SONORE / SOUND LEVEL (dBA)	MOTEUR / MOTOR PUISSANCE / POWER (HP)	MOTEUR / MOTOR ALIM. (VOLTS/Ø) / ELEC.SUPPLY	REMARQUES / REMARKS (VOIR LISTE CI-BAS) / (SEE LIST BELOW)
VE-DE	ÉVAC. LOCAUX 3000 /3001 *EXHAUST ROOM 3000/3001*	COOK **	270 CPA	5235	635		1233	CCW	BAU	82	10,0	575-3	B, F, H, I, MA, N10, U, X, BB
VE-DE2	ÉVAC. ENSACHAGE *BAGGING EXHAUST*	COOK **	180 CPA	1510	125		1156	CCW	TH	67	0,75	575-3	B, F, H, I, MA, N10, V, X, BB

LISTE DES REMARQUES

A- MOTEUR DE TYPE "ECM" (*VARI-FLOW*)
B- MOTEUR DE TYPE INDUSTRIEL DE TYPE "TEFC" HAUTE EFFICACITÉ DE TYPE "NEMA PREMIUM", CONÇU POUR ÊTRE CONTRÔLÉ PAR UN ENTRAINEMENT À FRÉQUENCE VARIABLE.
C- MODULE DE CONTRÔLE DE DÉBIT C/A SIGNAL 0-10V (CONTRÔLE PAR CENTRALISATION)
D- VARIATEUR DE VITESSE ÉLECTRIQUE INSTALLÉ ET PRÉFILÉ EN USINE SUR LE BOÎTIER DU VENTILATEUR.
E- SUSPENSION AU PLAFOND COMPRENANT ANCRAGES, TIGES FILETÉES ET ISOLATEURS DE VIBRATIONS MODÈLE SHR POSSÉDANT UNE FLEXION STATIQUE DE 50mm(2").
F- INSTALLATION AU PLANCHER OU SUR UNE BASE EN ACIER COMPRENANT ANCRAGES ET ISOLATEURS DE VIBRATIONS MODÈLE PARASISMIQUE POSSÉDANT UNE FLEXION STATIQUE DE 50mm(2").
G- INSTALLATION AU PLANCHER COMPRENANT ANCRAGES, BASE D'INERTIE, ISOLATEURS DE VIBRATIONS MODÈLE PARASISMIQUE POSSÉDANT UNE FLEXION STATIQUE DE 50mm(2").
H- ENTRAINEMENT À COURROIES AVEC GARDE-COURROIES EN ALUMINIUM MUNI D'OUVERTURES PERMETTANT LA PRISE DE LECTURE DES RÉVOLUTIONS DES ARBRES DU VENTILATEUR ET DU MOTEUR.
I- COUVERCLE PROTECTEUR D'ENTRAINEMENT A L'ÉPREUVE DES INTEMPÉRIES.
J- PORTE D'ACCÈS À PENTURE DU TYPE PIANO AVEC POIGNÉES TYPE SP-20 ET GARNITURE D'ÉTANCHEITÉ.
K- GRILLAGE PROTECTEUR À L'ENTRÉE DU VENTILATEUR.
L- CONSTRUCTION EN ACIER INOXYDABLE, NUANCE 316 L.
M- CONSTRUCTION À L'ÉPREUVE DES ÉTINCELLES. (EX: MA=AMCA"A")
N- VENTILATEUR CONSTRUIT SELON L'ARRANGEMENT. (EX: N9=ARR.9)
O- REVÊTEMENT PROTECTEUR À L'ÉPOXY SUR TOUTES LES SURFACES INTÉRIEURES ET EXTÉRIEURES.
P- VENTILATEUR APPROUVÉ PAR LES U.L. ET CONFORME AU STANDARD DU N.F.P.A. #96.
Q- REGISTRE À LAMES OPPOSÉES INSTALLÉ À LA DÉCHARGE DU VENTILATEUR.
R- VANNES D'ADMISSION MODULANTES.
S- GRILLAGE PROTECTEUR D'ARBRE SEMI-CYLINDRIQUE.
T- DRAIN DE VOLUTE, 1 1/4"Ø, FILETÉ
U- SECTIONNEUR PRÉFILÉ NEMA 3R
V- SECTIONNEUR PRÉFILÉ "X-PROOF"
W- BOÎTE À FILTRES ADAPTÉE AU VENTILATEUR, FILTRE MERV-8 (SURFACE FILTRANTE INDIQUÉE AU PLAN).
X- LIGNES DE GRAISSAGE EXTENSIONNÉES.
Y- GRILLE INTEGRÉE AU VENTILATEUR, COULEUR AU CHOIX DE L'ARCHITECTE.
Z- SORTIE MURALE EN ALUMINIUM C/A MOUSTIQUAIRE, COULEUR AU CHOIX DE L'ARCHITECTE.
AA- CONSTRUCTION COMPLÈTE EN ALUMINIUM
BB- TENSIONNEUR AUTOMATIQUE POUR COURROIE.

REMARKS LIST

A-"ECM" TYPE MOTOR (VARI-FLOW).
B- HIGH EFFICIENCY "TEFC" INDUSTRIAL NEMA PREMIUM TYPE MOTOR DESIGNED TO BE CONTROLLED BY A VARIABLE FREQUENCY DRIVE.
C- FLOW CONTROL MODULE C/A 0-10V SIGNAL (CENTRALIZED CONTROL)
D- ELECTRIC VARIABLE SPEED DRIVE FACTORY INSTALLED AND PRE-WIRED TO THE FAN HOUSING.
E- CEILING SUSPENSION INCLUDING ANCHORS, THREADED RODS AND VIBRATION ISOLATORS. SHR MODEL VIBRATION INSULATORS WITH 50MM (2") STATIC FLEXION.
F- FLOOR OR STEEL BASE INSTALLATION INCLUDING ANCHORS AND VIBRATION ISOLATORS VIBRATION ISOLATORS SEISMIC MODEL WITH A STATIC DEFLECTION OF 50MM(2") STATIC DEFLECTION.
G- FLOOR INSTALLATION INCLUDING ANCHORS, INERTIA BASE, VIBRATION ISOLATORS, SEISMIC MODEL WITH 50MM (2") STATIC DEFLECTION.
H- BELT DRIVE WITH BELT GUARDS WITH OPENINGS FOR READING THE FAN AND MOTOR SHAFT REVOLUTIONS.
I- WEATHERPROOF DRIVE COVER.
J- PIANO HINGED ACCESS DOOR WITH SP-20 HANDLES AND WATERPROOFING GASKET. WITH SP-20 TYPE HANDLES AND WATERPROOFING.
K- PROTECTIVE GRILL AT FAN INLET.
L- STAINLESS STEEL CONSTRUCTION, GRADE 316 L.
M- SPARK PROOF CONSTRUCTION. (EX: MA=AMCA "A")
N- FAN BUILT ACCORDING TO THE ARRANGEMENT. (EX: N9=ARR.9)
O- EPOXY PROTECTIVE COATING ON ALL INTERIOR AND EXTERIOR SURFACES. EXTERIOR SURFACES.
P- U.L. APPROVED FAN CONFORMING TO N.F.P.A. STANDARD #96.
Q- OPPOSED BLADE DAMPER INSTALLED AT FAN DISCHARGE.
R- MODULATING INLET VALVES.
S- SEMI-CYLINDRICAL SHAFT GUARD.
T- VOLUTE DRAIN, 1 1/4 "Ø, THREADED
U- NEMA 1 PREFILTERED DISCONNECT SWITCH
V- X-PROOF PRE-WIRED DISCONNECT SWITCH
W- FILTER BOX ADAPTED TO THE FAN, MERV-8 FILTER (FILTER SURFACE INDICATED ON THE DRAWING).
X- EXTENDED LUBRICATION LINES.
Y- GRILLE INTEGRATED TO THE FAN, COLOR TO BE CHOSEN BY THE ARCHITECT.
Z- ALUMINUM WALL OUTLET C/A INSECT SCREEN, COLOR TO BE CHOSEN BY THE ARCHITECT.
AA- COMPLETE ALUMINUM CONSTRUCTION
BB- AUTOMATIC BELT TENSIONER.

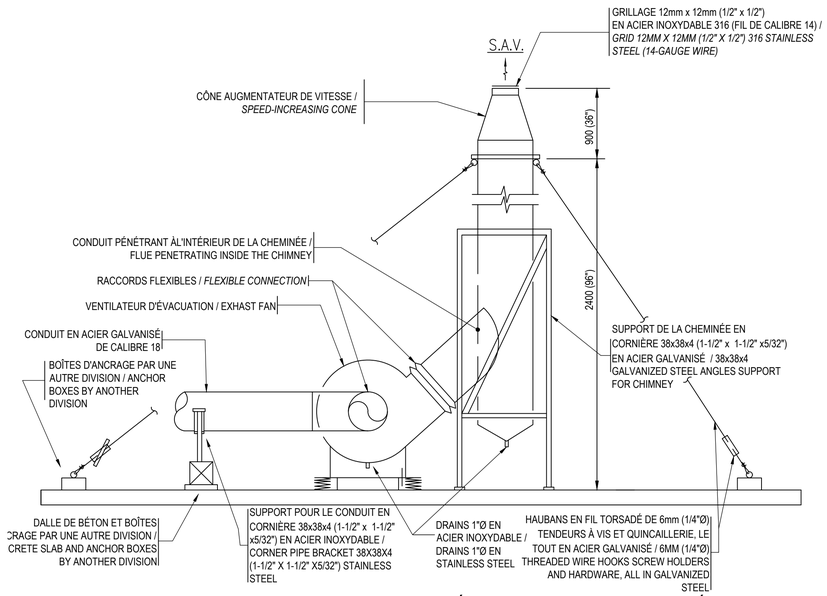
** PRODUIT NOMMÉ À TITRE DE RÉFÉRENCE SEULEMENT / *PRODUCT NAMED FOR REFERENCE ONLY*
PRODUITS ACCEPTABLES / ACCEPTABLE PRODUCTS: GREEHEEK, TWIN CITY, NEW YORK BLOWERS

CALORIFUGES POUR CONDUITS D'AIR / *THERMAL INSULATION FOR DUCTWORKS*

SYSTÈME ET/OU VENTILATEUR / *SYSTEM AND/OR FAN*	ÉPAISSEUR TOTALE / *TOTAL THICKNESS* 25mm (1")	38mm (1 1/2")	50mm (2")	100mm (4")	AUTRE	TYPE D-2 (1 RANG) D-2 (1 ROW)	D-4 (1 RANG) D-4 (1 ROW)	D-4 (2 RANGS) D-4 (2 ROWS)	CHEMISAGE CANVAS	REVETEMENT EXTÉRIEUR INSONORISANT (R.E.I.)	REVETEMENT EXTÉRIEUR INSONORISANT (R.E.I.)	EMPLACEMENT / *LOCATION*
SYSTÈME 1-VE *1-VE SYSTEM*	-	-	✓	-	-	✓		-	✓			CONDUIT D'ÉVACUATION À PARTIR DU MUR EXTÉRIEUR SUR UNE LONGUEUR DE 3 MÈTRES À L'INTÉRIEUR DU BÂTIMENT DANS TOUTES LES DIRECTIONS / EXHAUST DUCT FROM FROM EXTERIOR WALL FOR 3 METERS LENGTH INSIDE THE BUILDING IN ALL DIRECTIONS
CONDUIT DE COMPENSATION D'AIR FRAIS / *FRESH AIR DUCTWORK COMPENSATION*	-	-	✓	-	-	-	✓	-	✓			AU COMPLET / IN FULL

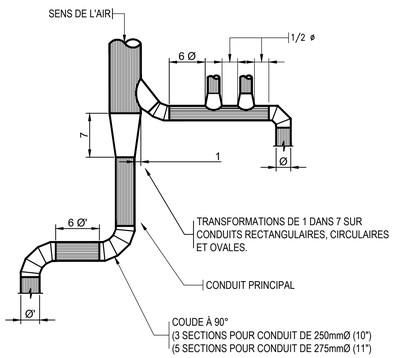
TABLEAU DES CONDUITS D'AIR / AIR DUCT TABLE

SYSTÈME ET/OU VENTILATEUR / SYSTEM AND/OR FAN	VIT. PRESSION / VELOCITY PRES.	TYPE	EMPLACEMENT / LOCATION
TOUS LES SYSTÈMES ET ÉQUIPEMENTS, SAUF INDICATION CONTRAIRE / ALL SYSTEMS AND EQUIPMENT, UNLESS OTHERWISE SPECIFIED	BV/BP LV/LP	TYPE D'ACIER / TYPE OF STEEL	TOUS LES CONDUITS / ALL DUCTS
VE-DE, VE-DE2	HV/HP HV/HP	ACIER GALVANISÉ / GALVANIZED STEEL	SYSTEME AU COMPLET C/A CHEMINÉE / FULL SYSTEM C/W CHIMNEY



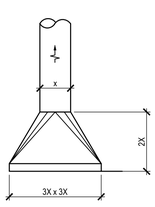
INSTALLATION D'UN VENTILATEUR D'ÉVACUATION AVEC CHEMINÉE / EXHAUST FAN WITH CHIMNEY INSTALLATION

ÉCHELLE = AUCUNE / NO SCALE

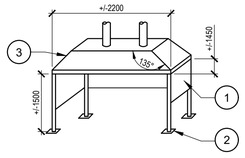


RACCORDS CONDUITS HAUTE VITESSE / HIGH VELOCITY DUCT FITTINGS

ÉCHELLE = AUCUNE / NO SCALE



BUSE DE CAPTATION (ITEM 14)
CAPTATION NOZZLE (ITEM 14)



1. MURETS (CÔTÉ ET ARRIÈRE) EN SECTIONS DE FEUILLES DE POLYCARBONATE TRANSPARENT (TEL QUE "LEXAN"). LE BAS DES MURETS DOIT ÊTRE SOUS LES COUVERTS DES BACS. LE MURET ARRIÈRE DOIT ÊTRE ADAPTÉ AU PASSAGE DE LA TUYAUTERIE / *SIDE AND REAR WALLS MADE OF SECTIONS OF TRANSPARENT POLYCARBONATE SHEET (SUCH AS "LEXAN"). THE BOTTOM OF THE WALLS MUST BE UNDER THE COVERS OF THE BINS. THE REAR WALL MUST BE SUITABLE FOR THE PASSAGE OF PIPING.*
2. PATTES EN CANTRUST GALVANISÉ DE 1 ½" SOUDÉES SUR DES PLAQUES D'ACIER GALVANISÉ VISSÉES AU PLANCHER / 1 ½" GALVANIZED CANTRUST BRACKETS WELDED TO GALVANIZED STEEL PLATES SCREWED TO THE FLOOR.
3. HOTTE DE CAPTURE EN ACIER GALVANISÉ DE CALIBRE 20, ENTIÈREMENT SOUDÉE. LES DIMENSIONS FINALES SONT À VALIDER SUR PLACE EN FONCTION DES DIMENSIONS DES BACS ET COUVERTS / CAPTURE HOOD IN 20-GAUGE GALVANIZED STEEL, FULLY WELDED. FINAL DIMENSIONS TO BE VALIDATED ON SITE ACCORDING TO BIN AND CUTLERY DIMENSIONS.

DÉTAIL HOTTE DE CAPTATION (ITEM 6)
CAPTATION HOOD DETAIL (ITEM 6)

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CONSULTANT - SOUS-CONSULTANT / CONSULTANT - SUB-CONSULTANT:

SCEAU / SEAL:

INGÉNIEUR Francis Boucher 5048180 QUÉBEC 2024-02-02

CLIENT / CLIENT:

Agriculture et Agroalimentaire Canada / Agriculture and Agri-Food Canada

Canada

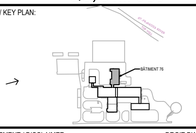
CENTRE DE RECHERCHE ET DE DÉVELOPPEMENT DE SHERBROOKE

RÉF. CLIENT / CLIENT REF. #: --

PROJET / PROJECT:

CORRECTIFS DU DÉPOUSSIÉRAGE DES AIRES DE PRÉPARATION AU COMPLEXE LAITIER (BATIMENT #76)
2000, RUE COLLÈGE, SHERBROOKE, QC, J1M 0C8

PLAN CLÉ / KEY PLAN:



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00		2024-02-02	SOUMISSION / FOR TENDER

NO PROJET / PROJECT NO: CA0015250.5522
DATE / DATE: 2024-02-02
ÉCHELLE ORIGINALE / ORIGINAL SCALE: AU PLAN
SI CETTE BARRE NE MESURE PAS 25 mm, AJUSTER VOTRE ÉCHELLE DE TRAÇAGE.
IF THIS BAR IS NOT 25 mm LONG, ADJUST YOUR PLOTTING SCALE.
25 mm
CONÇU PAR / DESIGNED BY: FRANCIS BOUCHER, ING.
DESSINÉ PAR / DRAWN BY: CHRISTIAN CORRIVEAU, TECH.
VÉRIFIÉ PAR / CHECKED BY: FRANCIS BOUCHER, ING.

DISCIPLINE / DISCIPLINE:
BÂTIMENT: VENTILATION

TITRE / TITLE:
VENTILATION - TABLEAUX ET DÉTAILS

NUMÉRO DU FEUILLET / SHEET NUMBER: **V03**
FEUILLET # / SHEET #: 3 DE / OF 3

ÉMISSION / ISSUE: **SOUMISSION / FOR TENDER**
RV./RV. #: **0**
EN DATE DU / DATE OF: **2024-02-02**

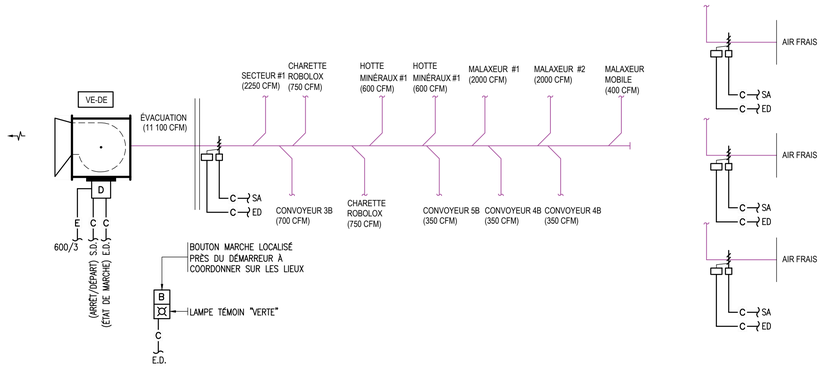

DIAGRAMME DE RÉGULATION - SYSTÈME VE-1

ÉCHELLE / SCALE: AUCUNE

LÉGENDE DE RÉGULATION

C	TUYAUTERIE DE CONTRÔLE ÉLECTRIQUE À INSTALLER
C	TUYAUTERIE DE CONTRÔLE ÉLECTRIQUE EXISTANTE À CONSERVER
D	DÉMARREUR MAGNÉTIQUE
M	REGISTRE MOTORISÉ
EFV	SAUF INDICATION CONTRAIRE AU DIAGRAMME, L'ENTRAÎNEMENT À FRÉQUENCE VARIABLE SERA FOURNI ET INSTALLÉ PAR DIVISION 16, VOIR PLAN ÉLECTRIQUE
NO	NORMALEMENT OUVERT
NF	NORMALEMENT FERMÉ
ED	ENTRÉE DIGITALE
SD	SORTIE DIGITALE
EA	ENTRÉE ANALOGIQUE
SA	SORTIE ANALOGIQUE

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CONSULTANT - SOUS-CONSULTANT / CONSULTANT - SUB-CONSULTANT:

SCEAU / SEAL:

INGÉNIEUR Francis Boucher 5048160 Québec
2024-02-02

CLIENT / CLIENT:

Agriculture et Agroalimentaire Canada | Agriculture and Agri-Food Canada

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CENTRE DE RECHERCHE ET DE DÉVELOPPEMENT DE SHERBROOKE

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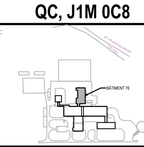
PLAN CLÉ / KEY PLAN:



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CONÇU PAR / DESIGNED BY: FRANCIS BOUCHER, ING.	
DESSINÉ PAR / DRAWN BY: CHRISTIAN CORRIVEAU, TECH.	
VÉRIFIÉ PAR / CHECKED BY: FRANCIS BOUCHER, ING.	

DISCIPLINE / DISCIPLINE:
BÂTIMENT: RÉGULATION

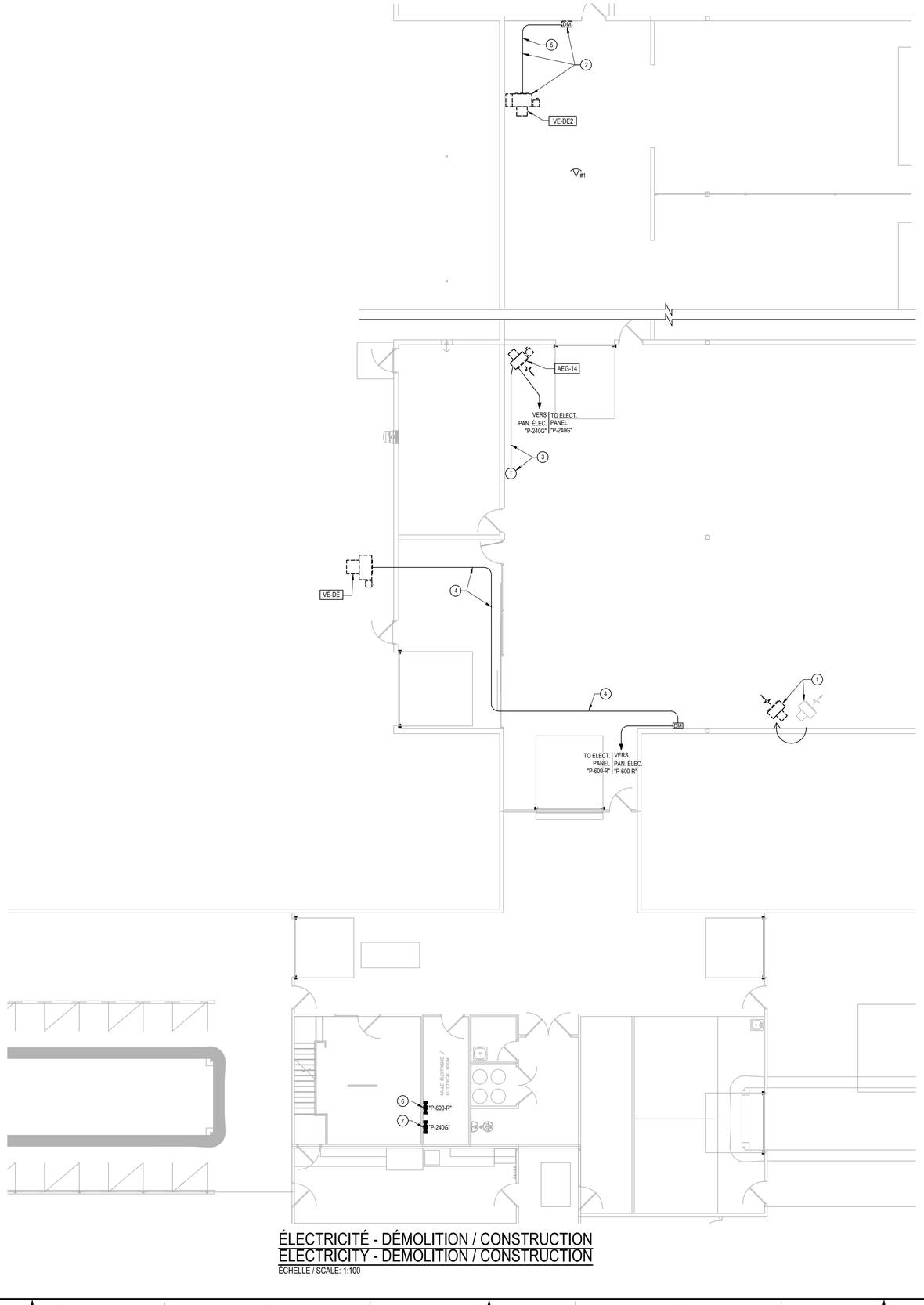
TITRE / TITLE:
RÉGULATION - DIAGRAMMES ET LÉGENDE

NUMÉRO DU FEUILLET / SHEET NUMBER:
R01

FEUILLET # / SHEET #: 1 DE / OF 1

ÉMISSION / ISSUE: **SOUMISSION / FOR TENDER** — # RV./RV. #: **0**

EN DATE DU / DATE OF: **2024-02-02**



ÉLECTRICITÉ - DÉMOLITION / CONSTRUCTION
ELECTRICITY - DEMOLITION / CONSTRUCTION

ÉCHELLE / SCALE: 1:100

LÉGENDE D'ÉLECTRICITÉ / ELECTRICITY LEGEND

ÉQUIPEMENTS / EQUIPMENTS

- PANNEAU ÉLECTRIQUE (EN SURFACE) / *ELECTRICAL PANEL (SURFACE MOUNTED)*
- SECTIONNEUR / *DISCONNECT SWITCH*
- DÉMARREUR MAGNÉTIQUE / *MAGNETIC STARTER*
- (T) THERMOSTAT BASSE TENSION / *LOW VOLTAGE THERMOSTAT*

STYLE DE LIGNE / LINE STYLES

- NOUVEL ÉQUIPEMENT / *NEW EQUIPMENT*
- ÉQUIPEMENT EXISTANT OU FOURNI PAR D'AUTRES / *EXISTING EQUIPMENT OR PROVIDED BY OTHERS*

IDENTIFIANTS / IDENTIFIERS

- XX-XX IDENTIFIANT D'ÉQUIPEMENT DE MÉCANIQUE, VOIR TABLEAU DES RACCORDEMENTS DE MÉCANIQUE AU PLAN E02 / *MECHANICAL EQUIPMENT IDENTIFIER, SEE TABLE OF MECHANICAL CONNECTIONS ON DRAWING E02*
- IDENTIFIANT DE PRISE DE VUE, VOIR PHOTO CORRESPONDANTE AU PLAN. / *PHOTO ID, SEE CORRESPONDING PHOTO ON DRAWING.*

NOTES GÉNÉRALES / GENERAL NOTES

1. VOIR LES DOCUMENTS CONTRACTUEL POUR CONNAÎTRE LES HEURES DE TRAVAUX SELON LE SECTEUR POUR L'ENSEMBLE DU PROJET / *SEE THE CONTRACT DOCUMENTS FOR HOURS OF WORK BY SECTOR FOR THE ENTIRE PROJECT*
2. SAUF INDICATIONS CONTRAIRES, RÉALISER LES NOUVELLES ALIMENTATIONS ÉLECTRIQUES À L'AIDE DE CONDUCTEURS RW SOUS CONDUITS EMT. / *UNLESS OTHERWISE SPECIFIED, MAKE NEW POWER SUPPLIES USING RW CONDUCTORS UNDER EMT CONDUITS.*
3. UTILISER DES CÂBLES TECK OU CONDUITS FLEXIBLES ÉTANCHES AUX LIQUIDES POUR LE RACCORDEMENT FINAL (DERNIER MÈTRE) AUX ÉQUIPEMENTS GÉNÉRATEURS DE VIBRATIONS (VENTILATEURS, AÉROTHERMES, ETC.) / *USE TECK CABLES OR LIQUID-TIGHT FLEXIBLE CONDUITS FOR THE FINAL (LAST METER) CONNECTION TO VIBRATION-GENERATING EQUIPMENT (FANS, UNIT HEATERS, ETC.)*
4. UTILISER DES CÂBLES TECK À L'EXTÉRIEUR. / *USE TECK CABLES OUTDOORS.*

NOTES SPÉCIFIQUES / SPECIFIC NOTES

1. AÉROTHERME AU GAZ À ÊTRE RELOCALISÉ (PAR ENTREPRENEUR EN PLOMBERIE). L'ÉLECTRICIEN DOIT PROCÉDER À LA DÉCONNECTION ÉLECTRIQUE (120V), PUIS À LA RECONNEXION AU NOUVEL EMPLACEMENT TOUT PRÈS. PROLONGER L'ALIMENTATION ÉLECTRIQUE AU BESOIN. / *GAS UNIT HEATER TO BE RELOCATED (BY PLUMBING CONTRACTOR). THE ELECTRICIAN MUST DISCONNECT THE ELECTRICAL (120V) AND THEN RECONNECT TO THE NEW LOCATION NEARBY. EXTEND THE POWER SUPPLY AS NEEDED.*
2. VENTILATEUR EXISTANT À ÊTRE REMPLACÉ PAR UN NOUVEAU (PAR ENTREPRENEUR EN VENTILATION). L'ÉLECTRICIEN DOIT PROCÉDER AU DÉMANTÈLEMENT DE L'ALIMENTATION ÉLECTRIQUE JUSQU'AU DÉMARREUR MAGNÉTIQUE EXISTANT (CONSERVER CE DERNIER). SUBSÉQUEMMENT, L'ENTREPRENEUR DOIT REFAIRE L'ALIMENTATION ÉLECTRIQUE DU DÉMARREUR EXISTANT AU NOUVEAU VENTILATEUR LOCALISÉ APPROXIMATIVEMENT AU MÊME EMPLACEMENT. VOIR PHOTO #1 / *EXISTING FAN TO BE REPLACED WITH A NEW ONE (BY VENTILATION CONTRACTOR). THE ELECTRICIAN MUST DISMANTLE THE POWER SUPPLY UP TO THE EXISTING MAGNETIC STARTER (KEEP THE LATTER). SUBSEQUENTLY, THE CONTRACTOR MUST REDO THE POWER SUPPLY FROM THE EXISTING STARTER TO THE NEW FAN LOCATED APPROXIMATELY AT THE SAME LOCATION. SEE PHOTO #1.*
3. THERMOSTAT BASSE TENSION, FOURNI PAR L'ENTREPRENEUR EN PLOMBERIE, MAIS INSTALLÉ ET RACCORDÉ À L'AÉROTHERME AU GAZ PAR L'ÉLECTRICIEN. / *LOW VOLTAGE THERMOSTAT, PROVIDED BY THE PLUMBING CONTRACTOR, BUT INSTALLED AND CONNECTED TO THE GAS UNIT HEATER BY THE ELECTRICIAN.*
4. CHEMINEMENT APPROXIMATIF, À COORDONNER SUR PLACE. / *APPROXIMATE ROUTE, TO BE COORDINATED ON SITE.*
5. NOUVEAU RACCORDEMENT ÉLECTRIQUE EN ENVIRONNEMENT EXPLOSIF, À RÉALISER DANS SON ENTIÉRETÉ À L'AIDE D'UN CÂBLE TECK AVEC CONNECTEURS APPROPRIÉS ANTI-EXPLOSIONS. / *NEW ELECTRICAL CONNECTION IN EXPLOSIVE ENVIRONMENT, TO BE MADE IN ITS ENTIRETY USING A TECK CABLE WITH SUITABLE ANTI-EXPLOSION CONNECTORS.*
6. PANNEAU ÉLECTRIQUE EXISTANT "P-600-R", 347/600V, 3Ø, 4F. FOURNIR ET INSTALLER DANS CELUI-CI UN NOUVEAU DISJONCTEUR 25A, 3P, SCCR TEL QU'AUTRES DISJONCTEURS DU PANNEAU, AFIN D'Y RACCORDER LE NOUVEAU VENTILATEUR D'ÉVACUATION "VE-DE". L'EMPLACEMENT RÉEL DU PANNEAU DANS LA SALLE ÉLECTRIQUE POURRAIT DIFFÉRER. / *EXISTING ELECTRICAL PANEL "P-600-R", 347/600V, 3Ø, 4F. SUPPLY AND INSTALL A NEW BREAKER 25A, 3P, SAME SCCR AS EXISTING BREAKERS, IN ORDER TO CONNECT THE NEW "VE-DE" EXHAUST FAN. THE ACTUAL LOCATION OF THE PANEL IN THE ELECTRICAL ROOM MAY DIFFER.*
7. PANNEAU ÉLECTRIQUE EXISTANT "P-240G", 225A, 120/240, 1Ø, 3F, DE MARQUE EATON, MODÈLE "PRL1A". FOURNIR ET INSTALLER DANS CELUI-CI UN NOUVEAU DISJONCTEUR 15A, 1P, SCCR TEL QU'AUTRES DISJONCTEURS DU PANNEAU, AU CIRCUIT #66, AFIN D'Y RACCORDER L'AÉROTHERME AU GAZ "AEG-14". L'EMPLACEMENT RÉEL DU PANNEAU DANS LA SALLE ÉLECTRIQUE POURRAIT DIFFÉRER. / *EXISTING ELECTRICAL PANEL "P-240G", 225A, 120/240, 1Ø, 3F, EATON BRAND, MODEL "PRL1A". SUPPLY AND INSTALL A NEW BREAKER 15A, 1P, SAME SCCR AS EXISTING BREAKERS, AT CIRCUIT #66, IN ORDER TO CONNECT THE NEW "AEG-14" GAZ UNIT HEATER. THE ACTUAL LOCATION OF THE PANEL IN THE ELECTRICAL ROOM MAY DIFFER.*

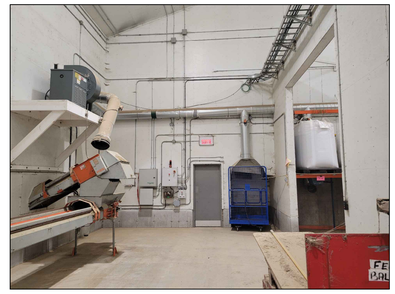


PHOTO #1

wsp
1135, BOULEVARD LEBOURGNEUF
QUÉBEC (QUÉBEC) CANADA G2K 0M5
TÉL. : 418 623-2254 | TÉLÉC. : 418 624-1857 | WWW.WSP.COM

CONSULTANT - SOUS-CONSULTANT / CONSULTANT - SUB-CONSULTANT:

SCEAU / SEAL:

Ordre des ingénieurs du Québec — Jean-Pascal Durivage — 5027251 — Ingénieur
02/02/2024

CLIENT / CLIENT:

Agriculture et Agroalimentaire Canada | Agriculture and Agri-Food Canada

Canada

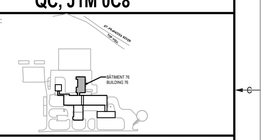
CENTRE DE RECHERCHE ET DE DÉVELOPPEMENT DE SHERBROOKE

RÉF. CLIENT / CLIENT REF. #: --

PROJET / PROJECT:

CORRECTIFS DU DÉPOUSSÉRAGE DES AIRES DE PRÉPARATION AU COMPLEXE LAITIER (BATIMENT #76)
2000, RUE COLLÈGE, SHERBROOKE, QC, J1M 0C8

PLAN CLÉ / KEY PLAN:



ÉMISSION - RÉVISION / ISSUED FOR - REVISION:

ÉM./IS.	RV./RV.	DATE / DATE	DESCRIPTION / DESCRIPTION
00		2024-02-02	SOUMISSION / FOR TENDER

NO PROJET / PROJECT NO: CA0015250.5522	DATE / DATE: --
ÉCHELLE ORIGINALE / ORIGINAL SCALE: AU PLAN / ON DRAWING	SI CETTE BARRE NE MESURE PAS 25 mm, AJUSTER VOTRE ÉCHELLE DE TRAÇAGE. / IF THIS BAR IS NOT 25 mm LONG, ADJUST YOUR PLOTTING SCALE. 25 mm
CONÇU PAR / DESIGNED BY: JEAN-PASCAL DURIVAGE, ING.	
VAR_TXT_NOM_DES CHRISTIAN CORRIVEAU, TECH.	
VÉRIFIÉ PAR / CHECKED BY: JEAN-PASCAL DURIVAGE, ING.	

DISCIPLINE / DISCIPLINE:
ÉLECTRICITÉ / ELECTRICITY

TITRE / TITLE:

LÉGENDE + VUES DE DÉMOLITION ET CONSTRUCTION / LEGEND + VIEWS OF DEMOLITION AND CONSTRUCTION

NUMÉRO DU FEUILLET / SHEET NUMBER:
E01

FEUILLET # / SHEET #: 1 DE / OF 2

ÉMISSION / ISSUE: **SOUMISSION / FOR TENDER** — # RV./RV. #: **0**

EN DATE DU / DATE OF: **2024-02-02**

Agriculture et Agroalimentaire Canada - Dépoussiéreur bâtiment 76 | CA0015250.5522 | 31 janvier 2024

Tableau des raccordements de mécanique

ÉQUIPEMENT																DÉMARREUR																DISPOSITIF DE SECTIONNEMENT												RACCORDEMENT	NOTES
						Fourni par			Installé par			Raccordé par										Fourni par			Installé par			Raccordé par							Fourni par			Installé par			Raccordé par				
Identification	Description	Puissance	Courant	Tension	Phase(s)	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Intégré à l'équipement	Démarreur manuel	Démarreur magnétique	Démarreur magnétique combiné	Sous boitier NEMA	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Intégré à l'équipement	Sectionneur	Sous boitier NEMA	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Ent. en ventilation	Ent. en plomberie	Ent. en électricité	Panneau, circuit	Voir au bas du tableau
VE-DE	Évac. locaux 3000/3001	10 HP	11.0 A	600 V	3 Ø	X			X			X		X			X		12			X			X			X	X												Voir note 1	1
VE-DE2	Évac. Ensachage	3/4 HP	1.3 A	600 V	3 Ø	X			X			X		X			X											X	X												Voir note 2	2
AEG-14	Aérotherme au gaz	288 W	2.4 A	120 V	1 Ø		X			X				X	X													X												P-240G, 66	

Remarques :

- Se référer au devis pour l'ensemble des exigences applicables au équipements du présent tableau.
- Les démarreurs magnétiques devront être fournis avec le matériel suivant :
  - Un sélecteur ON-OFF-AUTO
  - Un transformateur à tension secondaire de 24V, d'un minimum de 100VA.
  - Trois (3) lampes LED (Vert : en marche, Rouge : à l'arrêt, Ambre : arrêt sur faute)
  - Quatre (4) contacts auxiliaires (2 NO, 2 NF).

Notes :

1- Raccordement au panneau électrique "P-600-R", voir détail en plan.
2- Réutiliser le démarreur magnétique existant, acheminer l'alimentation électrique depuis celui-ci jusqu'au nouveau ventilateur.

Agriculture et Agroalimentaire Canada - Dépoussiéreur bâtiment 76 | CA0015250.5522 | 31 janvier 2024

Mechanical connections table

EQUIPEMENT																STARTER																DISCONNECT												POWER SUPPLY	NOTES
						Provided by			Installed by			Wired by										Provided by			Installed by			Wired by							Provided by			Installed by			Wired by				
Identifier	Description	Power	Current	Voltage	Phase(s)	Ventilation contractor	Plumbing contractor	Electrical contractor	Ventilation contractor	Plumbing contractor	Electrical contractor	Ventilation contractor	Plumbing contractor	Electrical contractor	Comes with equipement	Manual starter	Magnetic starter	Combined magnetic starter	NEMA enclosure	Ventilation contractor	Plumbing contractor	Electrical contractor	Ventilation contractor	Plumbing contractor	Electrical contractor	Ventilation contractor	Plumbing contractor	Electrical contractor	Comes with equipement	Disconnect switch	NEMA enclosure	Ventilation contractor	Plumbing contractor	Electrical contractor	Ventilation contractor	Plumbing contractor	Electrical contractor	Ventilation contractor	Plumbing contractor	Electrical contractor	Panel, circuit	See notes below table
VE-DE	Rooms 3000/3001 fan	10 HP	11.0 A	600 V	3 Ø	X			X			X		X			X		12			X			X			X	X												See note 1	1
VE-DE2	Bagging room fan	3/4 HP	1.3 A	600 V	3 Ø	X			X			X		X			X											X	X												See note 2	2
AEG-14	Gas unit heater	288 W	2.4 A	120 V	1 Ø		X			X				X	X													X												P-240G, 66	

Remarques :

- Refer to specification for all requirements applicable to the equipment in this table.
- Magnetic starters must be supplied with the following equipment:
  - One ON-OFF-AUTO selector
  - One 24V secondary voltage transformer, with a minimum of 100VA.
  - Three (3) LED lights (Green: On, Red: Off, Amber: Fault)
  - Four (4) auxiliary contacts (2 NO, 2 NC).

Notes :

1- Connection to the "P-600-R" electrical panel, see details on drawing.
2- Reuse the existing magnetic starter, route the power supply from it to the new fan.

CE DOCUMENT NE DOIT PAS ÊTRE UTILISÉ À DES FINS DE CONSTRUCTION (OU DE FABRICATION, OU D'INSTALLATION)

THIS DOCUMENT SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES (OR MANUFACTURING, OR INSTALLATION)

wsp
1135, BOULEVARD LEBOURGNEUF
QUÉBEC (QUÉBEC) CANADA G2K 0M5
TÉL. : 418 623-2254 | TÉLÉC. : 418 624-1857 | WWW.WSP.COM

CONSULTANT - SOUS-CONSULTANT / CONSULTANT - SUB-CONSULTANT:

SCEAU / SEAL:

Jean-Pascal Durivage 2527257 02/02/2024

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Agriculture et Agroalimentaire Canada | Agriculture and Agri-Food Canada

Canada

CENTRE DE RECHERCHE ET DE DÉVELOPPEMENT DE SHERBROOKE

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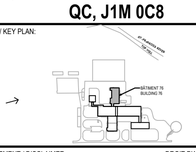

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00		2024-02-02	SOUMISSION / FOR TENDER

NO PROJET / PROJECT NO: CA0015250.5522
DATE / DATE: --
ÉCHELLE ORIGINALE / ORIGINAL SCALE: AU PLAN / ON DRAWING
CONÇU PAR / DESIGNED BY: JEAN-PASCAL DURIVAGE, ING.
VAR_TXT_NOM_DES: CHRISTIAN CORRIVEAU, TECH.
VÉRIFIÉ PAR / CHECKED BY: JEAN-PASCAL DURIVAGE, ING.

SI CETTE BARRE NE MESURE PAS 25 mm, AJUSTER VOTRE ÉCHELLE DE TRAÇAGE.
IF THIS BAR IS NOT 25 mm LONG, ADJUST YOUR PLOTTING SCALE:
25 mm

DISCIPLINE / DISCIPLINE: ÉLECTRICITÉ / ELECTRICITY

TITRE / TITLE:

TABLEAU DES RACCORDEMENTS DE MÉCANIQUE / MECHANICAL CONNECTIONS TABLE

NUMÉRO DU FEUILLET / SHEET NUMBER: **E02**
FEUILLET # / SHEET #: 2 DE / OF 2

ÉMISSION / ISSUE: **SOUMISSION / FOR TENDER**
EN DATE DU / DATE OF: **2024-02-02**
RV./RV. #: **0**

APPENDIX 1 – INTEGRITY PROVISIONS

(Text copied from the Ineligibility and Suspension Policy http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html dated 2016-04-04)

List of names: All Bidders, regardless of their status under the Policy, must submit the following information when participating in a procurement process or real property transaction:

- Bidders that are corporate entities, including those bidding as joint ventures, must provide a complete list of the names of all current directors or, for a privately owned corporation, the names of the owners of the corporation;
- Bidders Bidding as sole proprietors, including sole proprietors bidding as joint ventures, must provide a complete list of the names of all owners; or
- Bidders that are a partnership do not need to provide a list of names.

If the list of names has not been received in a procurement process or real property transaction by the time the evaluation of Bids or Offers is completed, or has not been received in a procurement process or real property transaction where no Bid/Offer will be submitted, the Contracting Authority will inform the Bidder of a time within which to provide the information. Providing the required names is a mandatory requirement for award of a contract or real property agreement. Failure to provide the list of names within the time specified will render a Bid or Offer non-responsive, or the Bidder otherwise disqualified for award of a contract or real property agreement.

APPENDIX 2 - LISTING OF SUBCONTRACTORS AND SUPPLIERS

The Bidder must submit the list of Subcontractors and Suppliers for any division of the Work as listed in the table below. If “own forces” of the General Contractor are planned to be used to execute certain division(s) of work it must also be indicated in the table below.

	Subcontractor and Suppliers	Division
1		
2		
3		
4		

ANNEX A - SECURITY REQUIREMENT CHECK LIST (SRCL)
(following page)

Government of Canada / Gouvernement du Canada

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

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

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine	2. Branch or Directorate / Direction générale ou Direction
AAC	Gestion des biens immobiliers
3. a) Subcontract Number / Numéro du contrat de sous-traitance	3. b) Name and Address of Subcontractor / Nom et adresse du sous-traitant

4. Brief Description of Work / Brève description du travail

Un contrat sera octroyé via le CSE à un consultant pour effectuer une analyse de risques de la poussière au bâtiment #76 (laiterie) du CRD de Sherbrooke. Les relevés pour les analyses sont à l'intérieur du bâtiment.

5. a) Will the supplier require access to Controlled Goods? Le fournisseur aura-t-il accès à des marchandises contrôlées?	☑ No Non	☐ Yes Oui
5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?	☑ No Non	☐ Yes Oui
6. Indicate the type of access required / Indiquer le type d'accès requis		
6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) (Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c)	☑ No Non	☐ Yes Oui
6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.	☐ No Non	☑ Yes Oui
6. c) Is this a commercial courier or delivery requirement with **no** overnight storage? S'agit-il d'un contrat de messagerie ou de livraison commerciale **sans** entreposage de nuit?	☑ No Non	☐ Yes Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada ☐	**NATO / OTAN** ☐	**Foreign / Étranger** ☐
7. b) Release restrictions / Restrictions relatives à la diffusion		
No release restrictions / Aucune restriction relative à la diffusion ☐	All NATO countries / Tous les pays de l'OTAN ☐	No release restrictions / Aucune restriction relative à la diffusion ☐
Not releasable / À ne pas diffuser ☐		
Restricted to: / Limité à : ☐	Restricted to: / Limité à : ☐	Restricted to: / Limité à : ☐
Specify country(ies): / Préciser le(s) pays :	Specify country(ies): / Préciser le(s) pays :	Specify country(ies): / Préciser le(s) pays :
7. c) Level of information / Niveau d'information		
PROTECTED A / PROTÉGÉ A ☐	NATO UNCLASSIFIED / NATO NON CLASSIFIÉ ☐	PROTECTED A / PROTÉGÉ A ☐
PROTECTED B / PROTÉGÉ B ☐	NATO RESTRICTED / NATO DIFFUSION RESTREINTE ☐	PROTECTED B / PROTÉGÉ B ☐
PROTECTED C / PROTÉGÉ C ☐	NATO CONFIDENTIAL / NATO CONFIDENTIEL ☐	PROTECTED C / PROTÉGÉ C ☐
CONFIDENTIAL / CONFIDENTIEL ☐	NATO SECRET / NATO SECRET ☐	CONFIDENTIAL / CONFIDENTIEL ☐
SECRET / SECRET ☐	COSMIC TOP SECRET / COSMIC TRÈS SECRET ☐	SECRET / SECRET ☐
TOP SECRET / TRÈS SECRET ☐		TOP SECRET / TRÈS SECRET ☐
TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) ☐		TOP SECRET (SIGINT) / TRÈS SECRET (SIGINT) ☐

Government of Canada / Gouvernement du Canada

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

PART A *(continued)* / PARTIE A *(suite)*

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

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

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

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

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

☐ RELIABILITY STATUS COTE DE FIABILITÉ	☐ CONFIDENTIAL CONFIDENTIEL	☐ SECRET SECRET	☐ TOP SECRET TRÈS SECRET
☐ TOP SECRET– SIGINT TRÈS SECRET – SIGINT	☐ NATO CONFIDENTIAL NATO CONFIDENTIEL	☐ NATO SECRET NATO SECRET	☐ COSMIC TOP SECRET COSMIC TRÈS SECRET
☐ SITE ACCESS ACCÈS AUX EMPLACEMENTS			

Special comments:
Commentaires spéciaux : Doit être escorté en tout temps dans les bâtiments d'AAC

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

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

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

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

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

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

PRODUCTION

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

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

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

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

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

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

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

SUMMARY CHART / TABLEAU RÉCAPITULATIF

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

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?
La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

☑ No / Non ☐ Yes / Oui

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

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?
La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

☑ No / Non ☐ Yes / Oui

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

Government of Canada / Gouvernement du Canada

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

PART D - AUTHORIZATION / PARTIE D - AUTORISATION

13. Organization Project Authority / Chargé de projet de l'organisme

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature
Jérôme Boutin	Gestionnaire de projets	Signature numérique de Boutin, Jerome Date : 2022.09.13 15:37:53 -04'00'

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
450-210-0598		jerome.boutin@agr.gc.ca	2022-09-13

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature
Lise Levesque-Masson	Coordonnatrice LVERS	Lise Levesque-Masson Digitally signed by Lise Levesque-Masson Date: 2022.09.14 08:09:21 -04'00'

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
613 773-1464		lise.levesque-masson@agr.gc.ca	

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?
Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?

☑ No / Non ☐ Yes / Oui

16. Procurement Officer / Agent d'approvisionnement

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

17. Contracting Security Authority / Autorité contractante en matière de sécurité

Name (print) - Nom (en lettres moulées)	Title - Titre	Signature

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date

Instructions for completion of a Security Requirements Check List (SRCL)

The instruction sheet should remain attached until Block #17 has been completed.

GENERAL - PROCESSING THIS FORM

The project authority shall arrange to complete this form.

The organization security officer shall review and approve the security requirements identified in the form, in cooperation with the project authority.

The contracting security authority is the organization responsible for ensuring that the suppliers are compliant with the security requirements identified in the SRCL.

All requisitions and subsequent tender / contractual documents including subcontracts that contain PROTECTED and/or CLASSIFIED requirements must be accompanied by a completed SRCL.

It is important to identify the level of PROTECTED information or assets as Level "A," "B" or "C," when applicable; however, certain types of information may only be identified as "PROTECTED". No information pertaining to a PROTECTED and/or CLASSIFIED government contract may be released by suppliers, without prior written approval of the individual identified in Block 17 of this form.

The classification assigned to a particular stage in the contractual process does not mean that everything applicable to that stage is to be given the same classification. Every item shall be PROTECTED and/or CLASSIFIED according to its own content. If a supplier is in doubt as to the actual level to be assigned, they should consult with the individual identified in Block 17 of this form.

PART A - CONTRACT INFORMATION

Contract Number (top of the form)
This number must be the same as that found on the requisition and should be the one used when issuing an RFP or contract. This is a unique number (i.e. no two requirements will have the same number). A new SRCL must be used for each new requirement or requisition (e.g. new contract number, new SRCL, new signatures).

1. **Originating Government Department or Organization**
   Enter the department or client organization name or the prime contractor name for which the work is being performed.

2. **Directorate / Branch**
   This block is used to further identify the area within the department or organization for which the work will be conducted.

3. **a) Subcontract Number**
   If applicable, this number corresponds to the number generated by the Prime Contractor to manage the work with its subcontractor.

   b) Name and Address of Subcontractor
   Indicate the full name and address of the Subcontractor if applicable.

4. **Brief Description of Work**
   Provide a brief explanation of the nature of the requirement or work to be performed.

5. **a) Will the supplier require access to Controlled Goods?**
   The Defence Production Act (DPA) defines "Controlled Goods" as certain goods listed in the Export Control List, a regulation made pursuant to the *Export and Import Permits Act* (EIPA). Suppliers who examine, possess, or transfer Controlled Goods within Canada must register in the Controlled Goods Directorate or be exempt from registration. More information may be found at www.cgd.gc.ca.

   b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations?
   The prime contractor and any subcontractors must be certified under the U.S./Canada Joint Certification Program if the work involves access to unclassified military data subject to the provisions of the Technical Data Control Regulations. More information may be found at www.dlis.dla.mil/jcp.

6. **Indicate the type of access required**

   Identify the nature of the work to be performed for this requirement. The user is to select one of the following types:

   a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets?

   The supplier would select this option if they require access to PROTECTED and/or CLASSIFIED information or assets to perform the duties of the requirement.

   b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted.

The supplier would select this option if they require regular access to government premises or a secure work site only. The supplier will not have access to PROTECTED and/or CLASSIFIED information or assets under this option.

c) Is this a commercial courier or delivery requirement with no overnight storage?

The supplier would select this option if there is a commercial courier or delivery requirement. The supplier will not be allowed to keep a package overnight. The package must be returned if it cannot be delivered.

7. Type of information / Release restrictions / Level of information

Identify the type(s) of information that the supplier may require access to, list any possible release restrictions, and if applicable, provide the level(s) of the information. The user can make multiple selections based on the nature of the work to be performed.

Departments must process SRCLs through PWGSC where:

- contracts that afford access to PROTECTED and/or CLASSIFIED foreign government information and assets;
- contracts that afford foreign contractors access to PROTECTED and/or CLASSIFIED Canadian government information and assets; or
- contracts that afford foreign or Canadian contractors access to PROTECTED and/or CLASSIFIED information and assets as defined in the documents entitled Identifying INFOSEC and INFOSEC Release.

a) Indicate the type of information that the supplier will be required to access

Canadian government information and/or assets

If Canadian information and/or assets are identified, the supplier will have access to PROTECTED and/or CLASSIFIED information and/or assets that are owned by the Canadian government.

NATO information and/or assets

If NATO information and/or assets are identified, this indicates that as part of this requirement, the supplier will have access to PROTECTED and/or CLASSIFIED information and/or assets that are owned by NATO governments. NATO information and/or assets are developed and/or owned by NATO countries and are not to be divulged to any country that is not a NATO member nation. Persons dealing with NATO information and/or assets must hold a NATO security clearance and have the required need-to-know.

Requirements involving CLASSIFIED NATO information must be awarded by PWGSC. PWGSC / CIISD is the Designated Security Authority for industrial security matters in Canada.

Foreign government information and/or assets

If foreign information and/or assets are identified, this requirement will allow access to information and/or assets owned by a country other than Canada.

b) Release restrictions

If **Not Releasable** is selected, this indicates that the information and/or assets are for **Canadian Eyes Only (CEO)**. Only Canadian suppliers based in Canada can bid on this type of requirement. NOTE: If Canadian information and/or assets coexists with CEO information and/or assets, the CEO information and/or assets must be stamped **Canadian Eyes Only (CEO)**.

If **No Release Restrictions** is selected, this indicates that access to the information and/or assets are not subject to any restrictions.

If **ALL NATO countries** is selected, bidders for this requirement must be from NATO member countries only.

NOTE: There may be multiple release restrictions associated with a requirement depending on the nature of the work to be performed. In these instances, a security guide should be added to the SRCL clarifying these restrictions. The security guide is normally generated by the organization's project authority and/or security authority.

c) Level of information

Using the following chart, indicate the appropriate level of access to information/assets the supplier must have to perform the duties of the requirement.

PROTECTED	CLASSIFIED	NATO
PROTECTED A	CONFIDENTIAL	NATO UNCLASSIFIED
PROTECTED B	SECRET	NATO RESTRICTED
PROTECTED C	TOP SECRET	NATO CONFIDENTIAL
	TOP SECRET (SIGINT)	NATO SECRET
		COSMIC TOP SECRET

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?
If Yes, the supplier personnel requiring access to COMSEC information or assets must receive a COMSEC briefing. The briefing will be given to the "holder" of the COMSEC information or assets. In the case of a "personnel assigned" type of contract, the customer department will give the briefing. When the supplier is required to receive and store COMSEC information or assets on the supplier's premises, the supplier's COMSEC Custodian will give the COMSEC briefings to the employees requiring access to COMSEC information or assets. If Yes, the Level of sensitivity must be indicated.

9. Will the supplier require access to extremely sensitive INFOSEC information or assets?
If Yes, the supplier must provide the Short Title of the material and the Document Number. Access to extremely sensitive INFOSEC information or assets will require that the supplier undergo a Foreign Ownership Control or Influence (FOCI) evaluation by CIISD.

PART B - PERSONNEL (SUPPLIER)

10. a) Personnel security screening level required

Identify the screening level required for access to the information/assets or client facility. More than one level may be identified depending on the nature of the work. Please note that Site Access screenings are granted for access to specific sites under prior arrangement with the Treasury Board of Canada Secretariat. A Site Access screening only applies to individuals, and it is not linked to any other screening level that may be granted to individuals or organizations.

RELIABILITY STATUS	CONFIDENTIAL	SECRET
TOP SECRET	TOP SECRET (SIGINT)	NATO CONFIDENTIAL
NATO SECRET	COSMIC TOP SECRET	SITE ACCESS

If multiple levels of screening are identified, a Security Classification Guide must be provided.

b) May unscreened personnel be used for portions of the work?

Indicating Yes means that portions of the work are not PROTECTED and/or CLASSIFIED and may be performed outside a secure environment by unscreened personnel. The following question must be answered if unscreened personnel will be used:

Will unscreened personnel be escorted?

If No, unscreened personnel may not be allowed access to sensitive work sites and must not have access to PROTECTED and/or CLASSIFIED information and/or assets.

If Yes, unscreened personnel must be escorted by an individual who is cleared to the required level of security in order to ensure there will be no access to PROTECTED and/or CLASSIFIED information and/or assets at the work site.

PART C - SAFEGUARDS (SUPPLIER)

11. INFORMATION / ASSETS

a) Will the supplier be required to receive and store PROTECTED and/or CLASSIFIED information and/or assets on its site or premises?

If Yes, specify the security level of the documents and/or equipment that the supplier will be required to safeguard at their own site or premises using the summary chart.

b) Will the supplier be required to safeguard COMSEC information or assets?

If Yes, specify the security level of COMSEC information or assets that the supplier will be required to safeguard at their own site or premises using the summary chart.

PRODUCTION

c) Will the production (manufacture, repair and/or modification) of PROTECTED and/or CLASSIFIED material and/or equipment occur at the supplier's site or premises?

Using the summary chart, specify the security level of material and/or equipment that the supplier manufactured, repaired and/or modified and will be required to safeguard at their own site or premises.

INFORMATION TECHNOLOGY (IT)

d) Will the supplier be required to use its IT systems to electronically process and/or produce or store PROTECTED and/or CLASSIFIED information and/or data?

If Yes, specify the security level in the summary chart. This block details the information and/or data that will be electronically processed or produced and stored on a computer system. The client department and/or organization will be required to specify the IT security requirements for this procurement in a separate technical document. The supplier must also direct their attention to the following document: Treasury Board of Canada Secretariat - Operational Security Standard: Management of Information Technology Security (MITS).

e) Will there be an electronic link between the supplier's IT systems and the government department or agency?

If Yes, the supplier must have their IT system(s) approved. The Client Department must also provide the Connectivity Criteria detailing the conditions and the level of access for the electronic link (usually not higher than PROTECTED B level).

SUMMARY CHART

For users completing the form **manually** use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.

For users completing the form **online** (via the Internet), the Summary Chart is automatically populated by your responses to previous questions.

PROTECTED	CLASSIFIED	NATO	COMSEC
PROTECTED A	CONFIDENTIAL	NATO RESTRICTED	PROTECTED A
PROTECTED B	SECRET	NATO CONFIDENTIAL	PROTECTED B
PROTECTED C	TOP SECRET	NATO SECRET	PROTECTED C
	TOP SECRET (SIGINT)	COSMIC TOP SECRET	CONFIDENTIAL
			SECRET
			TOP SECRET

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".

b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).

PART D - AUTHORIZATION

13. Organization Project Authority

This block is to be completed and signed by the appropriate project authority within the client department or organization (e.g. the person responsible for this project or the person who has knowledge of the requirement at the client department or organization). This person may on occasion be contacted to clarify information on the form.

14. Organization Security Authority

This block is to be signed by the Departmental Security Officer (DSO) (or delegate) of the department identified in Block 1, or the security official of the prime contractor.

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?

A Security Guide or Security Classification Guide is used in conjunction with the SRCL to identify additional security requirements which do not appear in the SRCL, and/or to offer clarification to specific areas of the SRCL.

16. Procurement Officer

This block is to be signed by the procurement officer acting as the contract or subcontract manager.

17. Contracting Security Authority

This block is to be signed by the Contract Security Official. Where PWGSC is the Contract Security Authority, Canadian and International Industrial Security Directorate (CIISD) will complete this block.

Instructions pour établir la Liste de vérification des exigences relatives à la sécurité (LVERS)

La feuille d'instructions devrait rester jointe au formulaire jusqu'à ce que la case 17 ait été remplie.

GÉNÉRALITÉS - TRAITEMENT DU PRÉSENT FORMULAIRE

Le responsable du projet doit faire remplir ce formulaire.

L'agent de sécurité de l'organisation doit revoir et approuver les exigences de sécurité qui figurent dans le formulaire, en collaboration avec le responsable du projet.

Le responsable de la sécurité des marchés est le responsable chargé de voir à ce que les fournisseurs se conforment aux exigences de sécurité mentionnées dans la LVERS.

Toutes les demandes d'achat ainsi que tous les appels d'offres et les documents contractuels subséquents, y compris les contrats de sous-traitance, qui comprennent des exigences relatives à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS doivent être accompagnés d'une LVERS dûment remplie.

Il importe d'indiquer si les renseignements ou les biens PROTÉGÉS sont de niveau A, B ou C, le cas échéant; cependant, certains types de renseignements peuvent être indiqués par la mention « PROTÉGÉ » seulement. Aucun renseignement relatif à un contrat gouvernemental PROTÉGÉ ou CLASSIFIÉ ne peut être divulgué par les fournisseurs sans l'approbation écrite préalable de la personne dont le nom figure à la case 17 de ce formulaire.

La classification assignée à un stade particulier du processus contractuel ne signifie pas que tout ce qui se rapporte à ce stade doit recevoir la même classification. Chaque article doit être PROTÉGÉ et/ou CLASSIFIÉ selon sa propre nature. Si un fournisseur ne sait pas quel niveau de classification assigner, il doit consulter la personne dont le nom figure à la case 17 de ce formulaire.

PARTIE A - INFORMATION CONTRACTUELLE

Numéro du contrat (au haut du formulaire)
Ce numéro doit être le même que celui utilisé sur la demande d'achat et services et devrait être celui utilisé dans la DDP ou dans le contrat. Il s'agit d'un numéro unique (c.-à-d. que le même numéro ne sera pas attribué à deux besoins distincts). Une nouvelle LVERS doit être utilisée pour chaque nouveau besoin ou demande (p. ex. un nouveau numéro de contrat, une nouvelle LVERS, de nouvelles signatures).

1. **Ministère ou organisme gouvernemental d'origine**
   Inscrire le nom du ministère ou de l'organisme client ou le nom de l'entrepreneur principal pour qui les travaux sont effectués.

2. **Direction générale ou Direction**
   Cette case peut servir à fournir plus de détails quant à la section du ministère ou de l'organisme pour qui les travaux sont effectués.

3. **a) Numéro du contrat de sous-traitance**
   S'il y a lieu, ce numéro correspond au numéro généré par l'entrepreneur principal pour gérer le travail avec son sous-traitant.

   b) Nom et adresse du sous-traitant
   Indiquer le nom et l'adresse au complet du sous-traitant, s'il y a lieu.

4. **Brève description du travail**
   Donner un bref aperçu du besoin ou du travail à exécuter.

5. **a) Le fournisseur aura-t-il accès à des marchandises contrôlées?**
   La *Loi sur la production de défense* (LPD) définit « marchandises contrôlées » comme désignant certains biens énumérés dans la Liste des marchandises d'exportation contrôlée, un règlement établi en vertu de la *Loi sur les licences d'exportation et d'importation* (LLEI). Les fournisseurs qui examinent, possèdent ou transfèrent des marchandises contrôlées à l'intérieur du Canada doivent s'inscrire à la Direction des marchandises contrôlées ou être exemptés de l'inscription. On trouvera plus d'information à l'adresse www.cgp.gc.ca.

   b) Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques?
   L'entrepreneur et tout sous-traitant doivent être accrédités en vertu du Programme mixte d'agrément Etats-Unis / Canada si le travail comporte l'accès à des données militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques. On trouvera plus d'information à l'adresse www.dlis.dla.mil/jcp/.

6. Indiquer le type d'accès requis

Indiquer la nature du travail à exécuter pour répondre à ce besoin. L'utilisateur doit choisir un des types suivants :

a) Le fournisseur et ses employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS?

Le fournisseur choisit cette option s'il doit avoir accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS pour accomplir le travail requis.

b) Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé.

Le fournisseur choisit cette option seulement s'il doit avoir accès régulièrement aux locaux du gouvernement ou à un lieu de travail protégé. Le fournisseur n'aura pas accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS en vertu de cette option.

c) S'agit-il d'un contrat de messagerie ou de livraison commerciale sans entreposage de nuit?

Le fournisseur choisit cette option s'il y a nécessité de recourir à un service de messagerie ou de livraison commerciale. Le fournisseur ne sera pas autorisé à garder un colis pendant la nuit. Le colis doit être retourné s'il ne peut pas être livré.

7. Type d'information / Restrictions relatives à la diffusion / Niveau d'information

Indiquer le ou les types d'information auxquels le fournisseur peut devoir avoir accès, énumérer toutes les restrictions possibles relatives à la diffusion, et, s'il y a lieu, indiquer le ou les niveaux d'information. L'utilisateur peut faire plusieurs choix selon la nature du travail à exécuter.

Les ministères doivent soumettre la LVERS à TPSGC lorsque:

- les marchés prévoient l'accès aux renseignements et aux biens de nature PROTÉGÉS et/ou CLASSIFIÉS étrangers ;
- les marchés prévoient aux entrepreneurs étrangers l'accès aux renseignements et aux biens de nature PROTÉGÉS et/ou CLASSIFIÉS canadiens; ou
- les marchés prévoient aux entrepreneurs étrangers ou canadiens l'accès aux renseignements et aux biens de nature PROTÉGÉS et/ou CLASSIFIÉS tels que définis dans les documents intitulés Moyens INFOSEC détermination et Divulgation de INFOSEC.

a) Indiquer le type d'information auquel le fournisseur devra avoir accès

Renseignements et/ou biens du gouvernement canadien

Si des renseignements et/ou des biens canadiens sont indiqués, le fournisseur aura accès à des renseignements et/ou à des biens PROTÉGÉS et/ou CLASSIFIÉS appartenant au gouvernement canadien.

Renseignements et/ou biens de l'OTAN

Si des renseignements et/ou des biens de l'OTAN sont indiqués, cela signifie que, dans le cadre de ce besoin, le fournisseur aura accès à des renseignements et/ou à des biens PROTÉGÉS et/ou CLASSIFIÉS appartenant à des gouvernements membres de l'OTAN. Les renseignements et/ou les biens de l'OTAN sont élaborés par des pays de l'OTAN ou leur appartiennent et ne doivent être divulgués à aucun pays qui n'est pas un pays membre de l'OTAN. Les personnes qui manient des renseignements et/ou des biens de l'OTAN doivent détenir une autorisation de sécurité de l'OTAN et avoir besoin de savoir.

Les contrats comportant des renseignements CLASSIFIÉS de l'OTAN doivent être attribués par TPSGC. La DSICI de TPSGC est le responsable de la sécurité désigné relativement aux questions de sécurité industrielle au Canada.

Renseignements et/ou biens de gouvernements étrangers

Si des renseignements et/ou des biens de gouvernements étrangers sont indiqués, ce besoin permettra l'accès à des renseignements et/ou à des biens appartenant à un pays autre que le Canada.

b) Restrictions relatives à la diffusion

Si **À ne pas diffuser** est choisi, cela indique que les renseignements et/ou les biens sont **réservés aux Canadiens**. Seuls des fournisseurs canadiens installés au Canada peuvent soumissionner ce genre de besoin. NOTA : Si des renseignements et/ou des biens du gouvernement canadien coexistent avec des renseignements et/ou des biens réservés aux Canadiens, ceux-ci doivent porter la mention **Réservé aux Canadiens**.

Si **Aucune restriction relative à la diffusion** est choisi, cela indique que l'accès aux renseignements et/ou aux biens n'est assujetti à aucune restriction.

Si **Tous les pays de l'OTAN** est choisi, les soumissionnaires doivent appartenir à un pays membre de l'OTAN.

NOTA : Il peut y avoir plus d'une restriction s'appliquant à une demande, selon la nature des travaux à exécuter. Pour ce genre de contrat, un guide de sécurité doit être joint à la LVERS afin de clarifier les restrictions. Ce guide est généralement préparé par le chargé de projet et/ou le responsable de la sécurité de l'organisme.

c) Niveau d'information

À l'aide du tableau ci-dessous, indiquer le niveau approprié d'accès aux renseignements et/ou aux biens que le fournisseur doit avoir pour accomplir les travaux requis.

PROTÉGÉ	CLASSIFIÉ	NATO
PROTÉGÉ A	CONFIDENTIEL	NATO NON CLASSIFIÉ
PROTÉGÉ B	SECRET	NATO DIFFUSION RESTREINTE
PROTÉGÉ C	TRÈS SECRET	NATO CONFIDENTIEL
	TRÈS SECRET (SIGINT)	NATO SECRET
		COSMIC TRÈS SECRET

8. **Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS?**
Si la réponse est Oui, les membres du personnel du fournisseur qui doivent avoir accès à des renseignements ou à des biens COMSEC doivent participer à une séance d'information COMSEC. Cette séance sera donnée au « détenteur autorisé » des renseignements ou des biens COMSEC. Dans le cas des contrats du type « personnel affecté », cette séance sera donnée par le ministère client. Lorsque le fournisseur doit recevoir et conserver, dans ses locaux, des renseignements ou des biens COMSEC, le responsable de la garde des renseignements ou des biens COMSEC de l'entreprise donnera la séance d'information COMSEC aux membres du personnel qui doivent avoir accès à des renseignements ou à des biens COMSEC.

9. **Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate?**
Si la réponse est Oui, le fournisseur doit indiquer le titre abrégé du document, le numéro du document et le niveau de sensibilité. L'accès à des renseignements ou à des biens extrêmement délicats INFOSEC exigera que le fournisseur fasse l'objet d'une vérification Participation, contrôle et influence étrangers (PCIE) effectuée par la DSICI.

PARTIE B - PERSONNEL (FOURNISSEUR)

10. **a) Niveau de contrôle de la sécurité du personnel requis**

Indiquer le niveau d'autorisation de sécurité que le personnel doit détenir pour avoir accès aux renseignements, aux biens ou au site du client. Selon la nature du travail, il peut y avoir plus d'un niveau de sécurité. Veuillez noter que des cotes de sécurité sont accordées pour l'accès à des sites particuliers, selon des dispositions antérieures prises auprès du Secrétariat du Conseil du Trésor du Canada. La cote de sécurité donnant accès à un site s'applique uniquement aux personnes et n'est liée à aucune autre autorisation de sécurité accordée à des personnes ou à des organismes.

COTE DE FIABILITÉ	CONFIDENTIEL	SECRET
TRÈS SECRET	TRÈS SECRET (SIGINT)	NATO CONFIDENTIEL
NATO SECRET	COSMIC TRÈS SECRET	ACCÈS AUX EMPLACEMENTS

Si plusieurs niveaux d'autorisation de sécurité sont indiqués, un guide de classification de sécurité doit être fourni.

b) Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?

Si la réponse est Oui, cela veut dire que certaines tâches ne sont pas PROTÉGÉES et/ou CLASSIFIÉES et peuvent être exécutées à l'extérieur d'un environnement sécurisé par du personnel n'ayant pas d'autorisation de sécurité. Il faut répondre à la question suivante si l'on a recours à du personnel n'ayant pas d'autorisation de sécurité :

Le personnel n'ayant pas d'autorisation de sécurité sera-t-il escorté?

Si la réponse est Non, le personnel n'ayant pas d'autorisation de sécurité ne pourra pas avoir accès à des lieux de travail dont l'accès est réglementé ni à des renseignements et/ou à des biens PROTÉGÉS et/ou CLASSIFIÉS.

Si la réponse est Oui, le personnel n'ayant pas d'autorisation de sécurité devra être escorté par une personne détenant la cote de sécurité requise, pour faire en sorte que le personnel en question n'ait pas accès à des renseignements et/ou à des biens PROTÉGÉS et/ou CLASSIFIÉS sur les lieux de travail.

PARTIE C - MESURES DE PROTECTION (FOURNISSEUR)

11. RENSEIGNEMENTS / BIENS :

a) Le fournisseur sera-t-il tenu de recevoir et d'entreposer sur place des renseignements ou des biens PROTÉGÉS et/ou CLASSIFIÉS?

Si la réponse est Oui, préciser, à l'aide du tableau récapitulatif, le niveau de sécurité des documents ou de l'équipement que le fournisseur devra protéger dans ses installations.

b) Le fournisseur sera-t-il tenu de protéger des renseignements ou des biens COMSEC?

Si la réponse est Oui, préciser, à l'aide du tableau récapitulatif, le niveau de sécurité des renseignements ou des biens COMSEC que le fournisseur devra protéger dans ses installations.

PRODUCTION

c) Les installations du fournisseur serviront-elles à la production (fabrication et/ou réparation et/ou modification) de matériel PROTÉGÉ et/ou CLASSIFIÉ?

Préciser, à l'aide du tableau récapitulatif, le niveau de sécurité du matériel que le fournisseur fabriquera, réparera et/ou modifiera et devra protéger dans ses installations.

TECHNOLOGIE DE L'INFORMATION (TI)

d) Le fournisseur sera-t-il tenu d'utiliser ses propres systèmes informatiques pour traiter, produire ou stocker électroniquement des renseignements ou des données PROTÉGÉS et/ou CLASSIFIÉS?

Si la réponse est Oui, préciser le niveau de sécurité à l'aide du tableau récapitulatif. Cette case porte sur les renseignements qui seront traités ou produits électroniquement et stockés dans un système informatique. Le ministère/organisme client devra préciser les exigences en matière de sécurité de la TI relativement à cet achat dans un document technique distinct. Le fournisseur devra également consulter le document suivant : Secrétariat du Conseil du Trésor du Canada – Norme opérationnelle de sécurité : Gestion de la sécurité des technologies de l'information (GSTI).

e) Y aura-t-il un lien électronique entre les systèmes informatiques du fournisseur et celui du ministère ou de l'agence gouvernementale?

Si la réponse est Oui, le fournisseur doit faire approuver ses systèmes informatiques. Le ministère client doit aussi fournir les critères de connectivité qui décrivent en détail les conditions et le niveau de sécurité relativement au lien électronique (habituellement pas plus haut que le niveau PROTÉGÉ B).

TABLEAU RÉCAPITULATIF

Les utilisateurs qui remplissent le formulaire **manuellement** doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

Dans le cas des utilisateurs qui remplissent le formulaire **en ligne** (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

PROTÉGÉ	CLASSIFIÉ	NATO	COMSEC
PROTÉGÉ A	CONFIDENTIEL	NATO DIFFUSION RESTREINTE	PROTÉGÉ A
PROTÉGÉ B	SECRET	NATO CONFIDENTIEL	PROTÉGÉ B
PROTÉGÉ C	TRÈS SECRET	NATO SECRET	PROTÉGÉ C
	TRÈS SECRET (SIGINT)	COSMIC TRÈS SECRET	CONFIDENTIEL
			SECRET
			TRÈS SECRET

12. a) La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

Si la réponse est Oui, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de

sécurité » au haut et au bas du formulaire.

b) La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

Si la réponse est Oui, classifier le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquer qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).

PARTIE D - AUTORISATION

13. Chargé de projet de l'organisme

Cette case doit être remplie et signée par le chargé de projet pertinent (c.-à-d. la personne qui est responsable de ce projet ou qui connaît le besoin au ministère ou à l'organisme client. On peut, à l'occasion, communiquer avec cette personne pour clarifier des renseignements figurant sur le formulaire.

14. Responsable de la sécurité de l'organisme

Cette case doit être signée par l'agent de la sécurité du ministère (ASM) du ministère indiqué à la case 1 ou par son remplaçant ou par le responsable de la sécurité du fournisseur.

15. Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?

Un Guide de sécurité ou un Guide de classification de sécurité sont utilisés de concert avec la LVERS pour faire part d'exigences supplémentaires en matière de sécurité qui n'apparaissent pas dans la LVERS et/ou pour éclaircir certaines parties de la LVERS.

16. Agent d'approvisionnement

Cette case doit être signée par l'agent des achats qui fait fonction de gestionnaire du contrat ou du contrat de sous-traitance.

17. Autorité contractante en matière de sécurité

Cette case doit être signée par l'agent de la sécurité du marché. Lorsque TPSGC est le responsable de la sécurité du marché, la Direction de la sécurité industrielle canadienne et internationale (DSICI) doit remplir cette case.

ANNEX B - CERTIFICATE OF INSURANCE

(Not required at solicitation closing)

CERTIFICATE OF INSURANCE Page 1 of 2

Travaux publics et Services gouvernementaux Canada
Public Works and Government Services Canada

Description and Location of Work	Contract No.
	Project No.

Name of Insurer, Broker or Agent	Address (No., Street)	City	Province	Postal Code
Name of Insured (Contractor)	**Address (No., Street)**	**City**	**Province**	**Postal Code**

Additional Insured

His Majesty the King in right of Canada as represented by the Minister of Public Works and Government Services

Type of Insurance	Insurer Name and Policy Number	Inception Date D / M / Y	Expiry Date D / M / Y	Limits of Liability		
				Per Occurrence	Annual General Aggregate	Completed Operations Aggregate
Commercial General Liability				**$**	**$**	**$**
Umbrella/Excess Liability				**$**	**$**	**$**

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

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

Telephone number

Signature

Date D / M / Y

General

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

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

The Policy shall be endorsed to provide the Owner with not less than 30 days' notice in writing in advance of any cancellation or change or amendment restricting coverage.

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

Commercial General Liability

The insurance coverage provided must not be substantially less than that provided by the latest edition of IBC Form 2100.
The policy must either include or be endorsed to include coverage for the following exposures or hazards if the Work is subject thereto:
(a) Blasting.
(b) Pile driving and caisson work.
(c) Underpinning.
(d) Removal or weakening of support of any structure or land whether such support be natural or otherwise if the work is performed by the insured contractor.
(e) Damage to existing structure
The policy must have the following minimum limits:
(a) **$5,000,000** Each Occurrence Limit;
(b) **$10,000,000** General Aggregate Limit per policy year if the policy contains a General Aggregate; and
(c) **$5,000,000** Products/Completed Operations Aggregate Limit.
Umbrella or excess liability insurance may be used to achieve the required limits.