NRC·CNRC Administrative Services and Property Management

SPECIFICATIONS

SOLICITATION #: 15-22162

BUILDING: M-58
1200 Montreal Road Campus
Ottawa, Ontario

PROJECT: M-58 Renovations, Ground Floor, South Wing

PROJECT #: M58-5083

Date: December 2015

National Research Council Canada | Conseil national de recherches Canada

Canada

SPECIFICATION

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NRC·CNRC

From **Discovery** to **Innovation...**

Directions to the Ottawa Research Facilities — Montreal Road

1200 Montréal Road
Ottawa, Ontario, Canada K1A 0R6

Tel: 613-993-9101

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By Road, from the OTTAWA International Airport

1. From the airport take the AIRPORT PARKWAY to RIVERSIDE DR EAST
2. Follow RIVERSIDE DR EAST to HIGHWAY 417 EAST
3. Take HIGHWAY 417 EAST, past the ST-LAURENT BLVD exit, where HIGHWAY 417 splits, continue LEFT on HIGHWAY 174 (ROCKLAND)
4. Exit HIGHWAY 174 on BLAIR RD NORTH
5. Proceed on BLAIR RD NORTH, cross OGILVIE RD, and continue on to the traffic lights at the intersection of BLAIR and MONTREAL RD
6. Turn left onto MONTREAL RD and take the first immediate right onto the ramp leading down to the traffic circle. Stop at Building M-1 on the north side of the traffic circle. Ask the commissionaires in M-1 for directions to the NRC building, institute or staff member you seek.

By Road, from MONTRÉAL

1. Take MÉTROPOLITAIN 40 WEST and follow signs for OTTAWA and HIGHWAY 417 WEST
2. Follow 417 WEST to reach OTTAWA
3. Exit at HIGHWAY 174 EAST (ROCKLAND) when entering OTTAWA
4. Follow 174 EAST and exit at BLAIR RD NORTH (first exit after entering 174 EAST)
5. Follow BLAIR RD NORTH, cross OGILVIE RD, and continue on to the traffic lights at the intersection of BLAIR and MONTREAL RD
6. Turn left onto MONTREAL RD and take the first immediate right onto the ramp leading down to the traffic circle. Stop at Building M-1 on the north side of the traffic circle. Ask the commissionaires in M-1 for directions to the NRC building, institute or staff member you seek.


1 Sussex Facilities
2 Montreal Road Facilities
3 Uplands Facilities
4 NRC-CSTT
N
GATINEAU
OTTAWA
QUÉBEC
ONTARIO
Outaouais
Aylmer
Taché
Rockcliffe
Montréal
Vanier
Aviation
Blair
Sussex
Wellington
Bank
Bronson
Island Park
Ottawa River
Carling
Fisher
Prince of Wales
Walkley
Heron
Hawthorne
Hunt Club
Baseline
Riverside
Conroy
Airport
Uplands
Lester
Davidson
Albion
Hunt Club (W)
Merivale
Woodroffe
Greenbank
Fallowfield
Leitrim
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NRC Institute
Trans Canada HWY
Major HWY
Secondary HWY
Airport
Train Station
Ferry
Bus Station
Metro


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Montréal
Mackenzie
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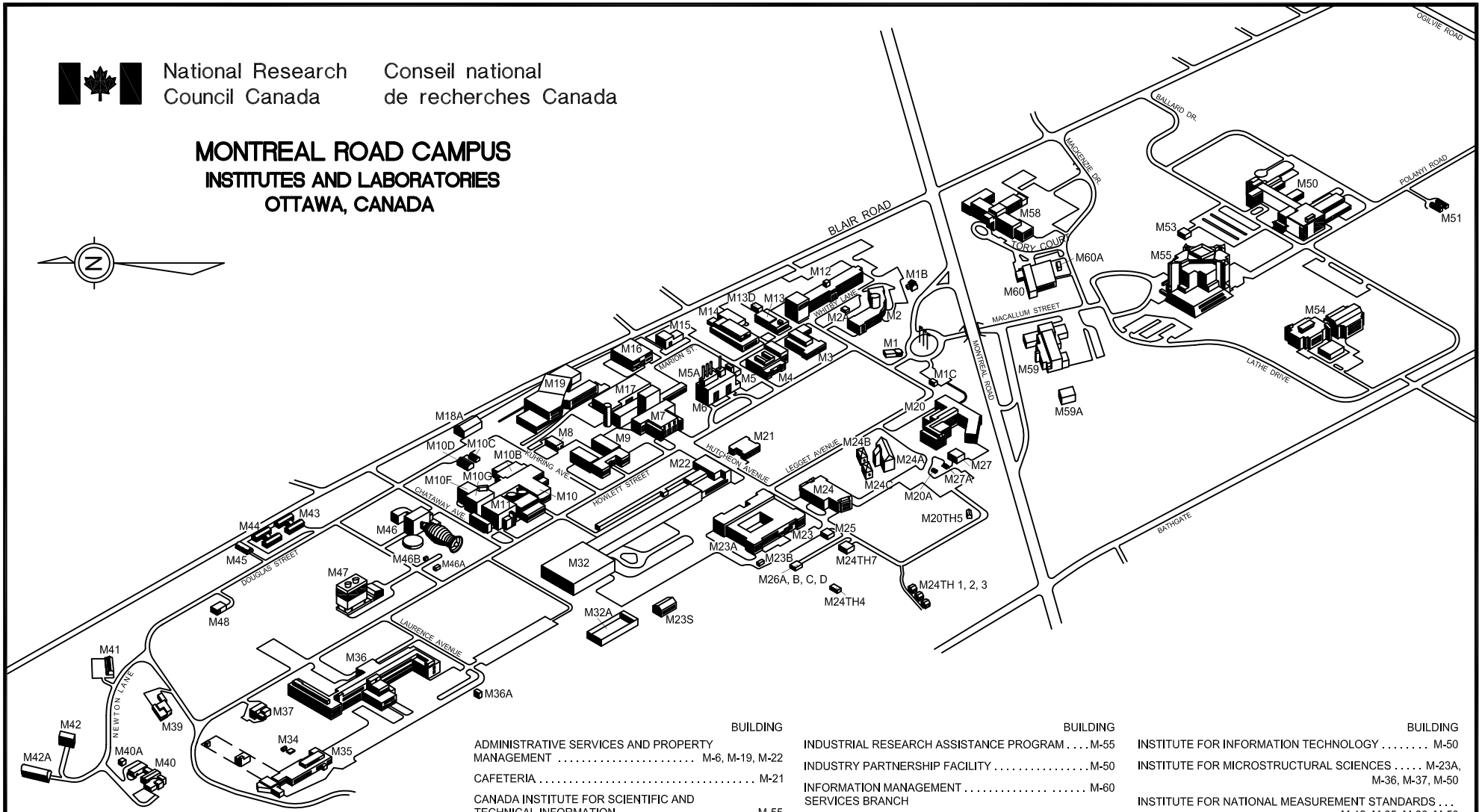
Airport
Ferry
Metro
Trans Canada HWY
Secondary HWY
Train Station
Bus Station

National Research Council Canada | Conseil national de recherches Canada

MONTREAL ROAD CAMPUS
INSTITUTES AND LABORATORIES
OTTAWA, CANADA



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Updated: July 2008

National Research Council Canada	Conseil national de recherches Canada
Administrative Services & Property management Branch (ASPM)	Direction des services administratif et gestion de l'immobilier (SAGI)

Construction Tender Form

Project Identification **M-58 Renovations, Ground Floor, South Wing**

Tender No.: **15-22162**

1.2 **Business Name and Address of Tenderer**

Name_____

Address_____

_____

Contact Person(Print Name)_____

Telephone (_____) _____ **Fax**: (_____) _____

1.3 Offer

I/We the Tenderer, hereby offer to Her Majesty the Queen in Right of Canada (hereinafter referred to as "Her Majesty") represented by the National Research Council Canada to perform and complete the work for the above named project in accordance with the Plans and Specifications and other Tender Documents, at the place and in the manner set out therein for the Total Tender Amount (to be expressed in numbers only) of**: $_____. _____ in lawful money of Canada (excluding GST/HST)**

The above amount is inclusive of all applicable (*) Federal, Provincial and Municipal taxes except that in the event of a change in any tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property, that occurs

.1 after the date this tender was mailed or delivered, or
.2 if this tender is revised, after the date of the last revision

the amount of this offer shall be decreased or decreased in the manner provided for in GC22 of the General Conditions of the Contract Documents.

1.3.1 Offer (continued)

(*) For the purpose of this tender, the Goods and Services Tax (GST) is not to be considered as an applicable tax.

In the province of Quebec, the Quebec Sales Tax is not to be included in the tender amount because the Federal Government is exempt from this tax. Tenderers shall make arrangements directly with the provincial Revenue Department to recover any tax they may pay on good and servives acquired in the performance of this contract. However, tenderers should include in their tender amount Quebec Sales Tax for which an Input Tax Refund is not available.

1.4 Acceptance and Entry into Contract

I/We undertake, within fourteen (14) days of notification of acceptance of my/our offer, to sign a contract for the performance of the work provided I/we are notified, by the Department, of the acceptance of my/our offer within 30 days of the tender closing date.

1.5 Construction Time

I/We Agree to complete the work within the time stipulated in the specification from the date of notification of acceptance of my/our offer.

1.6 Bid Security

I/We herewith enclose tender security in accordance with Article 5 of the General Instruction to Tenderers.

I/We understand that if a security deposit is furnished as tender security and if I/we refuse to enter into a contract when called upon to do so, my/our security deposit shall be forfeited but the Minister may, if it is in the public interest, waive the right of Her Majesty to forfeit the security deposit.

I/We understand that if the security furnished is not in the approved from as described in Article 5 of the General Instructions to Tenderers, my/our tender is subject to disqualification.

1.7 Contract Security

Within fourteen (14) days after receipt of written notification of the acceptance of my/our offer, I/we will furnish contract security in accordance with the Contract Conditions "F" of the Contract Documents.

I/We understand that the contract security referred to herein, if provided in the form of a bill of exchange, will be deposited into the Consolidated Revenue Fund of Canada.

1.8 Appendices

This Tender Form includes Appendix No. _____N/A_____.

1.9 Addenda

The Total Tender Amount provides for the Work described in the following Addenda:

NUMBER	DATE	NUMBER	DATE

(Tenderers shall enter numbers and dates of addenda)

1.10 Execution of Tender

The Tenderer shall refer to Article 2 of the General Instructions to Tenderers.

SIGNED, ATTESTED TO AND DELIVERED on the _____day of _____on behalf of

_____

(Type or print the business name of the Tenderer)

AUTHORIZED SIGNATORY (IES)

_____

(Signature of Signatory)

_____

(Print name & Title of Signatory)

_____

(Signature of Signatory)

_____

(Print name & Title of Signatory)

SEAL

BUY AND SELL NOTICE

M-58 Renovations, Ground Floor, South Wing

The National Research Council Canada, 1200 Montreal Road Campus, Ottawa, ON has a requirement for a project that includes:

Renovate the ground floor, south wing at M-58. New offices and print shop. Lighting, power systems, mechanical systems.

1. GENERAL

Questions regarding any aspect of the project are to be addressed to and answered only by the Departmental Representative (or his designate) or the Contracting Authority.

Any information received other than from the Departmental Representative (or his designate) or the Contracting Authority will be disregarded when awarding the contract and during construction.

Firms intending to submit tenders on this project should obtain tender documents through the Buyandsell.gc.ca TMA services provider. Addenda, when issued, will be available from the Buyandsell.gc.ca TMA service provider. Firms that elect to base their bids on tender documents obtained from other sources do so at their own risk and will be solely responsible to inform the tender calling authority of their intention to bid. Tender packages are not available for distribution on the actual day of tender closing.

2. MANDATORY SITE VISIT

It is mandatory that the bidder attends one of the site visits at the designated date and time. At least one representative from proponents that intend to bid must attend.

The site visits will be held on January 7th and January 8th 2016 at **9:00** . Meet Mark O'Connor at Building M-50, Main Entrance, 1200 Montreal Road Campus , Ottawa, ON. Bidders who, for any reason, cannot attend at the specified date and time will not be given an alternative appointment to view the site and their tenders, therefore, will be considered as non-responsive. **NO EXCEPTIONS WILL BE MADE.**

As proof of attendance, at the site visit, the Contracting Authority will have an Attendance Form which MUST be signed by the bidder's representative. It is the responsibility of all bidders to ensure they have signed the Mandatory Site Visit Attendance form prior to leaving the site. Proposals submitted by bidders who have not attended the site visit or failed to sign the Attendance Form will be deemed non-responsive.

3. CLOSING DATE

Closing date is January 20h , 2016 at 14:00.

4. TENDER RESULTS

Following the Tender closing, the tender results will be sent by facsimile to all Contractors who submitted a tender

5. SECURITY REQUIREMENT FOR CANADIAN CONTRACTORS

5.1 MANDATORY SECURITY REQUIREMENT:

This procurement contains a mandatory security requirement as follows:

1 The Contractor must, at all times during the performance of the Contract, hold a valid Designated Organization Screening (DOS), issued by the Canadian Industrial Security Director (CISD), Public Works Government Services Canada.

2 The Contractor personnel requiring access to sensitive work site(s) must EACH hold a valid RELIABILITY STATUS, granted or approved by CISD/PWGSC.

3 The Contractor must comply with the provisions of the:
   a. Security Requirements Checklist attached at Appendix "D"
   b. Industrial Security Manual (Latest Edition) available at: http://ssi-iss.tpsgc-pwgsc.gc.ca/msi-ism/-eng.html

5.2 VERIFICATION OF SECURITY CLEARANCE AT BID CLOSING

1 The Bidder must hold a valid Designated Organization Screening (DOS) issued by the Canadian Industrial Security Directorate (CISD), Public Works and Government Services Canada (PWGSC), TO BE INCLUDED WITH THEIR TENDER OR PROVIDED WITHIN 48 HOURS FROM THE DATE AND TIME OF TENDER CLOSING. Verifications will be made through CISD to confirm the security clearance status of the Bidder. Failure to comply with this requirement will render the bid non-compliant and no further consideration will be given to the bid.

2 Within 72 hours of tender closing, the General Contractor must name all of his sub-contractors, each of whom must hold a valid RELIABILITY STATUS, granted or approved by CISD/PWGSC, or any other Federal Department or Agency along with the names and birthdates or security clearance certificate numbers of all personnel who will be assigned to the project.

3 It is to be noted that any subcontractor required to perform any part of the work during the performance of the subsequent contract must also adhere to the mandatory security requirement of the contract. As well, no personnel without the required level of security will be allowed on site. It will be the responsibility of the successful bidder to ensure that the security requirement is met throughout the performance of the contract. The Crown will not be held liable or accountable for any delays or additional costs associated with the contractor's non-compliance to the mandatory security requirement. Failure to comply with the mandatory security requirement will be grounds for being declared in default of contract.

4 For any enquiries concerning the project security requirement during the bidding period, the Bidder/Tenderer must contact the Security Officer @ 613-993-8956.

6.0 WSIB (WORKPLACE SAFETY AND INSURANCE BOARD)

1 All Bidders must provide a valid WSIB certificate with their Tender or prior to contract award.

7.0 OFFICE OF THE PROCUREMENT OMBUDSMAN

1 Dispute Resolution Services
The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will, on request or consent of the parties to participate in an alternative dispute resolution process to resolve any dispute between the parties respecting the interpretation or application of a term and condition of this contract and their consent to bear the cost of such process, provide to the parties a proposal for an alternative dispute resolution process to resolve their dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca.

2 Contract Administration
The parties understand that the Procurement Ombudsman appointed pursuant to Subsection 22.1(1) of the *Department of Public Works and Government Services Act* will review a complaint filed by [*the supplier or the contractor or the name of the entity awarded this contract*] respecting administration of this contract if the requirements of Subsection 22.2(1) of the *Department of Public Works and Government Services Act* and Sections 15 and 16 of the *Procurement Ombudsman Regulations* have been met, and the interpretation and application of the terms and conditions and the scope of the work of this contract are not in dispute. The Office of the Procurement Ombudsman may be contacted by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca.

3 The Office of the Procurement Ombudsman (OPO) was established by the Government of Canada to provide an independent avenue for suppliers to raise complaints regarding the award of contracts under $25,000 for goods and under $100,000 for services. You have the option of raising issues or concerns regarding the solicitation, or the award resulting from it, with the OPO by contacting them by telephone at 1-866-734-5169 or by e-mail at boa.opo@boa-opo.gc.ca. You can also obtain more information on the OPO services available to you at their website at www.opo-boa.gc.ca.

The Departmental Representative or his designate for this project is: **Mark O'Connor**
Telephone: **613 991-9873**

Contracting Authority for this project is: **Marc Bédard marc.bedard@nrc-cnrc.gc.ca**
Telephone**: 613 993-2274**

INSTRUCTIONS TO BIDDERS

Article 1 – Receipt of Tender

1a) Tenders must be received not later than the specified tender closing time. Tenders received after this time are invalid and shall not be considered, regardless of any reason for their late arrival.

1b) A letter of printed telecommunication from a bidder quoting a price shall not be considered as a valid tender unless a formal tender has been received on the prescribed Tender Form.

1c) Bidders may amend their tenders by letter or printed telecommunication provided that such amendments are received not later than the specified tender closing time.

1d) Any amendments to the tender which are transmitted by telefax must be signed and must clearly identify the tenderer.

All such amendments are to be addressed to:
National Research Council of Canada
Marc Bedard, Senior Contracting Officer
Building M-22
Montreal Road, Ottawa, Ontario
K1A 0R6

Fax: (613) 991-3297

Article 2 – Tender Form & Qualifications

1) All tenders must be submitted on the Construction Tender Form and the tender must be signed in compliance with the following requirements:

a) Limited Company: The full names of the Company and the name(s) and status of the authorized signing officer(s) must be printed in the space provided for that purpose. The signature(s) of the authorized officer(s) and the corporate seal must be affixed.

b) Partnership: The firm name and the name(s) of the person(s) signing must be printed in the space provided. One or more of the partners must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.

c) Sole Proprietorship : The business name and the name of the sole proprietor must be printed in the space provided. The sole proprietor must sign in the presence of a witness who must also sign. An adhesive coloured seal must be affixed beside each signature.

2) Any alterations in the printed part of the Construction Tender Form or failure to provide the information requested therein, may render the tender invalid.

3) All space in the Construction Tender Form must be completed and any handwritten or typewritten corrections to the parts so completed must be initialed immediately to the side of the corrections by the person or persons executing the tender on behalf of the the tenderer.

4) Tenders must be based on the plans, specifications and tender documents provided.

Article 3 - Contract

1) The Contractor will be required to sign a contract similar to the Standard Contract Form for Fixed Price Construction Contracts, a blank specimen of which is enclosed in the package for reference purposes.

Article 4 – Tender Destination

1a) Tenders are to be submitted in sealed envelopes to:
National Research Council Canada
Administrative Services and Property Management Branch
1200 Montreal Road
Building M-22
Ottawa, ON
K1A 0R6

Endorsed "Tender for (insert title of work as it appears in the drawings and specifications)" and must bear the name and address of the tenderer.

1b) Unless otherwise specified, the only documents required to be submitted with the tender are the Tender form and the Bid Security.

Article 5 - Security

1a) Bid Security is required and must be submitted in one of the following forms:

i) a certified cheque payable to the Receiver General for Canada and drawn on a member of the Canadian Payments Association or a local cooperative credit society that is a member of a central cooperative credit society having membership in the Canadian Payments Association; **OR**

ii) bonds of the Government of Canada, or bonds unconditionally guaranteed as to principal and interest by the Government of Canada; **OR**

iii) a bid bond.

1b) Regardless of the Bid Security submitted, it should never be more than $250,000 maximum, calculated at 10% of the first $250,000 of the tendered price, plus 5% of any amount in excess of $250,000.

2a) Bid Security shall accompany each tender or, if forwarded separately from the tender, shall be provided not later than the specified tender closing time. Bid Security must be in the ORIGINAL form. Fax or photocopies and NOT acceptable. FAILURE TO PROVIDE THE REQUIRED BID SECURITY SHALL INVALIDATE THE TENDER.

2b) If the tender is not accepted, the Bid Security submitted pursuant to Article 8 shall be returned to the tenderer.

3a) The successful tenderer is required to provide security within 14 days of receiving notice of tender acceptance. The tenderer must furnish EITHER:

i) a Security Deposit as described in 1(b) above together with a Labour and Material Payment Bond in the amount of at least 50% of the amout payable under the contract, OR

ii) a Performance Bond and a Labour and Material Payment Bond – each in the amount of 50% of the amount payable under the contract.

3b) Should it not be possible to obtain a Labour Material Payment Bond as required under 3(a) above, on making application thereof to at least two acceptable Bonding Companies, an additional Security Deposit of a straight 10% of the amount payable under the contract must be furnished.

3c) Where a tender has been accompanied by a Security Deposit, as described in 1(b) above, the amount of the Security Deposit required under 3(a) above may be reduced by the amount of the Security Deposit which accompanied the tender.

3d) Bonds must be in an approved form and from the companies whose

bonds are acceptable to the Government of Canada. Samples of the approved form of Bid Bond, Performance Bond and Labour and Material Payment Bond and a list of acceptable Bonding Companies may be obtained from the Contracting Officer, National Research Council, Building M-22, Montreal Road, Ottawa, Ontario, K1A 0R6.

Article 6 – Interest On Security Deposits

1) Tenderers are notified that they must make their own arrangements with their bankers as to the interest, if any, on the amount of the certified cheque accompanying their tender. The Council will not pay interest on said cheque pending the awarding of the contract nor be responsible for the payments of interest under any arrangement made by the tenderers.

Article 7 – Sales Tax

1) The amount of the tender shall include all taxes as levied under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act or the Customs Tariff, in force or applicable at the time.

2) In Quebec, the Provincial Sales Tax should not be included in the Tender Price as the Federal Government is exempt. Tenderers should contact the Provincial Revenue Minister to recover all taxes paid for goods and services rendered under this contract.

Tenderers must include in their Tender Price the amount of Provincial Sales Tax for which the exemption does not apply.

Article 8 – Examination of Site

1) All parties tendering shall examine the sites of the proposed work before sending in their tender and make themselves thoroughly acquainted with the same and obtain for themselves any and all information that may be necessary for the proper carrying out of the Contract. No after claim will be allowed or entertained for any work or material that may be requisite and necessary for the proper execution and completion of this Contract with the exception of that provided for under GC 35 in the General Conditions of the General Specification.

Article 9 – Discrepancies, Omissions, Etc.

1a) Bidders finding discrepancies in, or omissions from, drawings, specifications or other documents, or having any doubt as to the meaning or intent of any part thereof, should at once notify the Engineer who will send written instructions or explanation to all bidders.

1b) Neither the Engineer nor the Council will be responsible for oral instructions.

1c) Addenda or corrections issued during the time of the bidding shall be covered in the proposal. However, the contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work and made prior to the date of the contract.

Article 10 – No additional Payments for Increased Costs

1) The only other adjustments in the contract price allowed are those specified in the General Conditions of the General Specification. The contract price will not be amended for change in freight rates, exchange rates, wage rates or cost of materials, plant or services.

Article 11 – Awards

1a) The Council reserves the power and right to reject tenders received from parties who cannot show a reasonable acquaintance with and preparation for the proper performance of the class of work herein specified and shown on plans. Evidence of such competence must be furnished by the tenderers if required to do so.

1b) A tenderer may be required to furnish to the Contracting Office, National Research Council of Canada, Building M-22, 1200 Montreal Road, Ottawa, Ontario, K1A 0R6, Canada, unsigned copies of the insurance requirements as covered by the Insurance Conditions of the General Specification.

1c) The Council does not bind itself to accept the lowest or any tender.

Article 12 – Harmonized Sales Tax

1) The Harmonized Sales Tax (HST) which in now in effect shall be considered an applicable tax for the purpose of this tender. However, the bidder shall NOT include any amount in the bid price for said HST. The successful contractor will indicate on each application for payment as a separate amount the appropriate HST the Owner is legally obliged to pay. This amount will be paid to the Contractor in addition to the amount certified for payment under the Contract in addition to the amount certified for payment under the Contract and will therefore not affect the Contract Price. The Contractor agrees to remit any HST collected or due to Revenue Canada.

Non-resident contractors

RST guide 804
Published August 2006
ISBN: 1-4249-2007-8 (Print), **1-4249-2009-4 (PDF), 1-4249-2008-6 (HTML)**

Publication Archived

Notice to the reader: For Retail Sales Tax (RST) – On July 1, 2010 the 13 per cent Harmonized Sales Tax (HST) took effect in Ontario replacing the existing provincial Retail Sales Tax (RST) and combining it with the federal Goods and Services Tax (GST). As a result, RST provisions described on this page and in other publications ended on June 30, 2010.

Effective July 1, 2010 this publication was archived for RST purposes **only**. Use caution when you refer to it, since it reflects the law in force for RST at the time it was released and may no longer apply.

- The information in this Guide explains the Retail Sales Tax (RST) responsibilities of a non-resident contractor who is awarded a construction contract to perform work in Ontario and their Ontario customers. Please note that this Guide replaces the previous version dated March 2001.

Non-Resident Contractor Defined

A non-resident contractor is a contractor located outside Ontario who has been awarded a construction contract to perform work in Ontario, and who has not maintained a permanent place of business in Ontario continuously for twelve months immediately prior to signing the contract, or which is not a company incorporated under the laws of Ontario. A construction contract is a contract for the erection, remodelling or repair of a building or other structure on land.
A contractor is a person who is in the business of constructing, altering, repairing or improving real property and includes, but is not limited to,

1. a general contractor and subcontractor,
2. a carpenter, bricklayer, stonemason, electrician, plasterer, plumber, painter, decorator, paver, and bridge builder,
3. a sheet metal, tile and terrazzo, heating, air conditioning, insulation, ventilating, papering, road, roofing and cement contractor, who installs or incorporates items into real property. (See RST Guide 206 - Real Property and Fixtures).

Registration and Guarantee Deposit

Non-resident contractors who are awarded a construction contract in Ontario are required to register with the Ministry of Finance (ministry), Centralized Programs Unit and post a guarantee equal to 4 per cent of the total of each Ontario contract. The guarantee can be paid in cash, by certified cheque (payable to the Minister of Finance), letter of credit or by a guarantee bond.

To register with the ministry and to obtain further information on posting a guarantee, contractors should contact the ministry's Centralized Programs Unit, 33 King Street West, PO Box 623, Oshawa, Ontario, L1H 8H7, toll-free 1 866 ONT-TAXS (1 866 668-8297) or fax to 905 435-3617.

Non-resident contractors who sell taxable goods on a supply only basis to Ontario customers, or provide taxable services in Ontario, may obtain a regular Vendor Permit to collect and remit RST on their sales. Non-resident contractors who have been issued a regular Vendor Permit must still register separately with the ministry and post a guarantee if they are awarded a construction contract in Ontario.

Letter of Compliance

After receiving the guarantee, the ministry mails out two copies of a "letter of compliance" to the contractor certifying the Retail Sales Tax (RST) requirements have been met. Contractors must give a copy of the letter to their customers.

If a copy of the compliance letter is not provided, the customer must withhold 4 per cent of all amounts payable to the non resident contractor and pay the withheld amounts to the Minister of Finance (minister). Details relating to the contract should be sent along with the payments to the Centralized Programs Unit. Customers may give the minister a guarantee bond equal to 4 per cent of the total contract price instead of making the 4 per cent payments.

Note: Customers who do not follow these requirements may be held liable for 4 per cent of all amounts payable to the non resident contractor or any other amount that the Ministry deems to be the RST payable resulting from the performance of the contract.

Calculation of RST

Fair Value

RST is payable on the "fair value" of materials, purchased or brought into Ontario, to be used for work performed in Ontario. "Fair value" includes:

- the purchase price in Canadian funds;
- all charges by the supplier for handling and delivery, and
- any federal customs duties and excise taxes paid (but not the federal Goods and Services Tax (GST)).

Contractors are also required to pay RST to Ontario suppliers on the purchase, rental or lease of taxable services, materials, machinery, or equipment.

Machinery and Equipment - Leased

If machinery or equipment is leased from a supplier outside Ontario and brought into the province, RST is payable on the lease payments for the period the machinery or equipment is in Ontario.

Machinery and Equipment - Owned by Contractor

If machinery or equipment is owned by the contractor, RST may be calculated in one of the following ways:

a. If a contractor brings machinery and equipment into Ontario for less than 12 months' use, RST is to be calculated using the following formula:

   1/36 × net book value at date of import × number of months in Ontario × tax rate

   For the purpose of this formula, RST is payable for each month or part of a month that the goods are in Ontario. A month is considered 31 consecutive days and a part month is considered more than 12 days. The RST payable is based on the number of days the machinery and equipment are located in Ontario and not the number of days the items are actually used.

Example: Equipment is brought into Ontario on March 28 and taken out on May 8. The items were in the province for 41 days. RST is payable on the first 31 days' temporary stay in Ontario vs. use of the equipment. Since the remainder (10 days) is not considered part of a month, no RST is payable on this portion.

b. If, at the time the goods are brought into Ontario, it is expected that the machinery or equipment will be in Ontario for more than twelve months, contractors must pay Retail Sales Tax (RST) on the following basis:

   net book value at date of import × tax rate

   If, at the time of import, the length of time is not known, vendors may use the formula under (a). If they later find it necessary to keep the machinery and equipment in Ontario for more than 12 months, the RST paid under (a) may be deducted from the RST payable under (b).

Using formula (a) or (b) above, contractors will calculate and remit the RST payable on the return that is filed when the contract is finished.

(See Completion of Contract section)

Manufacturing for Own Use

Contractors may need to manufacture items, such as doors and windows, for their construction contracts. Manufacturing is work done in a factory away from a construction site, or in a mobile unit or workshop that is on or near the construction site. Manufacturing occurs when raw materials are changed into manufactured goods for use in real property contracts.

Contractors are considered to be manufacturing contractors if they produce goods:
1. for their own use in real property contracts, and
2. the manufactured cost of the goods is more than $50,000 a year.

(See RST Guide 401 - Manufacturing Contractors)

Contracts with the Federal Government

Where a non-resident contractor enters into a construction contract with the federal government, for the construction of a building and/or the installation of equipment, the nature of the equipment will determine whether the contract should be let on a tax-included or tax excluded basis.

Contracts for the construction of a building and the installation of equipment that directly services that building (i.e., elevators, escalators, light fixtures, central heating and air conditioning, etc.) should be tendered on a tax -included basis. Contractors are the consumers of the materials used in fulfilling these contracts and must pay or account for RST on the materials used to complete the contracts. There is NO exemption just because the contract is with the federal government.

Contracts for the installation of equipment that becomes a fixture and does not directly service a building (i.e., material handling equipment, production machinery, communication equipment, training equipment) may be tendered on a tax-excluded basis. Contractors engaged in contracts of this nature are permitted to make tax exempt purchases of such equipment by issuing a valid Purchase Exemption Certificate (PEC) to their supplier. Only non-resident contractors who have registered with the ministry and posted a guarantee may issue a PEC.

Exemptions

Contractors may supply and install equipment or materials for certain customers that may be entitled to an exemption from RST (e.g., manufacturers, Indian band councils, farmers and diplomatic organizations). The equipment or materials, when installed, becomes real property if it is permanently attached to land, or a fixture if it is permanently attached to a building or real property structure. Since

contractors are liable for RST, they should contact the ministry to find out if the customer qualifies for exemption before tendering the contract on a tax-excluded basis.

Status Indians, Indian Bands and Band Councils

Non-resident contractors may purchase building materials exempt from Retail Sales Tax (RST) for certain buildings and structures situated on reserves. The cost of such projects must be paid by the band council, and the buildings must provide a community service for the reserve. Contracts for the construction of an exempt community building project should be made on an RST-excluded basis. Non-resident contractors may purchase the materials exempt from RST by providing suppliers with a valid Purchase Exemption Certificate (PEC). As noted previously, only non-resident contractors who have registered with the ministry and posted a guarantee may issue a PEC. (See RST Guide 204 - Purchase Exemption Certificates).

Non-resident contractors must pay RST on items purchased for incorporation into a building or structure built for individual status Indians on a reserve. (See RST Guide 808 - Status Indians, Indian Bands and Band Councils).

Completion of Contract

When a contract is completed, non-resident contractors who were required to post a guarantee must complete a Non-Resident Contractor Retail Sales Tax Return [PDF - 92 KB] that is provided by the ministry.

If a contractor's guarantee was given in cash or by certified cheque, the amount of the deposit can be deducted from the RST liability owed by the contractor. If the liability is greater than the deposit, the amount remaining must be paid by the contractor. If the deposit is more than the liability, the contractor will receive a refund.

If a guarantee bond was posted instead of cash, the bond will be discharged once the RST liability is paid in full.

All returns are subject to audit.

Legislative References

- Retail Sales Tax Act, Subsections 19(2) and 39(3)(4) and (5)
- Regulation 1012 under the Act, Subsections 15.3(1)(2)(5)(6) and (7)
- Regulation 1013 under the Act, Sections 1 and 3

For More Information

The information contained in this publication is only a guideline. For more information, please contact the Ontario Ministry of Finance at 1 866 ONT-TAXS (1 866 668-8297) or visit our website at ontario.ca/finance.

Acceptable Bonding Companies

Published September 2010

The following is a list of insurance companies whose bonds may be accepted as security by the government.

1. Canadian Companies

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

- Travelers Guarantee Company of Canada
- Trisura Guarantee Insurance Company
- The Wawanesa Mutual Insurance Company
- Waterloo Insurance Company
- Western Assurance Company
- Western Surety Company

2. Provincial Companies

Surety bonds issued by the following companies may be accepted provided that the contract of suretyship was executed in a province in which the company is licensed to do business as indicated in brackets.

- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
- AXA Boreal Insurance Company (P.E.I., N.B., Que., Ont., Man., B.C.)
- ALPHA, Compagnie d'Assurances Inc. (Que.)
- Canada West Insurance Company (Ont., Man., Sask, Alta., B.C., N.W.T.) (Surety only)
- The Canadian Union Assurance Company (Que.)
- La Capitale General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., Que.(Surety only), Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- Coachman Insurance Company (Ont.)
- Continental Casualty Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- GCAN Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- The Insurance Company of Prince Edward Island (N.S., P.E.I., N.B.)
- Kingsway General Insurance Company (N.S., N.B., Que., Ont., Man., Sask., Alta., and B.C.)
- Liberty Mutual Insurance Company (Nfld. & Lab., N.S., P.E.I., N.B., Que., Ont., Man., Sask., Alta., B.C., Nun., N.W.T., Yuk.)
- Manitoba Public Insurance Corporation (Man.)
- Norgroupe Assurance Générales Inc.
- Orleans General Insurance Company (N.B., Que., Ont.)
- Saskatchewan Government Insurance Office (Sask.)
- SGI CANADA Insurance Services Ltd. (Ont., Man., Sask., Alta.)
- L'Unique General Insurance Inc. (Nfld. & Lab., N.S., P.E.I., N.B., Que.(Surety only), Ont.(Surety only), Man., Sask., Alta., B.C.(Surety only), Nun., N.W.T., Yuk.)

3. Foreign Companies

- Aspen Insurance UK Limited
- Compagnie Française d'Assurance pour le Commerce Extérieur (Fidelity only)
- Eagle Star Insurance Company Limited
- Ecclesiastical Insurance Office Public Limited Company (Fidelity only)
- Lloyd's Underwriters
- Mitsui Sumitomo Insurance Company, Limited
- NIPPONKOA Insurance Company, Limited
- Sompo Japan Insurance Inc.
- Tokio Marine & Nichido Fire Insurance Co., Ltd.
- XL Insurance Company Limited (Surety only)
- Zurich Insurance Company Ltd

Articles of Agreement

Standard Construction Contract – Articles of Agreement
(23/01/2002)

A1 Contract Documents

A2 Date of Completion of Work and Description of Work

A3 Contract Amount

A4 Contractor's Address

A5 Unit Price Table

A r t i c l e s o f A g r e e m e n t

These Articles of Agreement made in duplicate this day of .

Between

Her Majesty the Queen, in right of Canada (referred to in the contract documents as " Her Majesty") represented by the National Research Council Canada (referred to in the contract documents as the "Council")

and

(referred to in the contract documents as the "Contractor")

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

A1 Contract Documents

(23/01/2002)

1.1 Subject to A1.4 and A1.5, the documents forming the contract between Her Majesty and the Contractor, referred to herein as the contract documents, are

1.1.1 these Articles of Agreement,

1.1.2 the document attached hereto, marked "A" and entitled "Plans and Specifications", referred to herein as the Plans and Specifications,

1.1.3 the document attached hereto, marked "B" and entitled "Terms of Payment", referred to herein as the Terms of Payment,

1.1.4 the document attached hereto, marked "C" and entitled "General Conditions", referred to herein as the General Conditions,

1.1.5 the document attached hereto, marked "D" and entitled "Labour Conditions", referred to herein as the Labour Conditions,

1.1.6 the document attached hereto, marked "E" and entitled "Insurance Conditions", referred to herein as the Insurance Conditions,

1.1.7 the document attached hereto, marked "F" and entitled "Contract Security Conditions", referred to herein as the Contract Security Conditions, and

1.1.8 any amendment or variation of the contract documents that is made in accordance with the General Conditions.

1.1.9 the document entitled Fair Wage Schedules for Federal Construction Contracts referred to herein as Fair Wage Schedules

1.1.10

The Council hereby designates of
of the Government of Canada as the Engineer for the purposes of the contract, and for all purposes of or incidental to the contract, the Engineer's address shall be deemed to be:

1.2 **In the contract**

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

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

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

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

A2 Date of Completion of Work and Description of Work

(23/01/2002)

2.1 The contractor shall, between the date of these Articles of Agreement and the **,** , in the careful and workmanlike manner, diligently perform and complete the following work:

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

A3 Contract Amount

(23/01/2002)

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

3.1.1 the sum of (GST/HST extra), in consideration for the performance of the work or the part thereof that is subject to Fixed Price Arrangement, and

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

3.2 For the information and guidance of the Contractor and the persons administering the contract on behalf of Her Majesty, but not so as to constitute a warranty , representation or undertaking of any nature by either party, it is estimated that the total amount payable by Her Majesty to the Contractor for the part of the work to which a Unit Price Arrangement is applicable will be approximately $N/A

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

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

A4 Contractor's Address

(23/01/2002)

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

A5 Unit Price Table

(23/01/2002)

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

Column 1 Item	**Column 2** Class of Labour Plant Or Material	**Column 3** Unit of Measurement	**Column 4** Estimated Total Quantity	**Column 5** Price per Unit	**Column 6** Estimated Total Price
		N/A			

5.2 The Unit Price Table that is set out in A5.1 designates the part of the work to which a Unit Price Arrangement is applicable.

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

Articles of Agreement

Signed on behalf of Her Majesty by

_____

as Senior Contracting Officer

and_____

as_____

of the **National Research Council Canada**

on the_____

day of _____

Signed, sealed and delivered by

_____

as_____and
Position

by_____

as_____
Position

Seal

of

on the_____

day of_____

Specifications:

List of Drawings:

Architectural	5083-A00	Cover Sheet & Key Plan
	5083-A01	Demolition Plan
	5083-A02	Plan Details - Demolition
	5083-A03	Section Details - Demolition
	5083-A04	New Floor Plan and New Reflected Ceiling Plan
	5083-A05	Furniture Plan Layout
	5083-A06	Building Sections – New Construction
	5083-A07	Plan Details – New Construction
	5083-A08	Section Details – New Construction
	5083-A09	Metal Cart Details – New Construction
	5083-A10	Kitchen Millwork – New Construction
	5083-A11	Furniture Millwork – New Construction
	5083-A12	Door, Window and Room Finish Schedule – New Construction
Structural	5083-S01	Structural: Ground Floor and First Floor Plans and Details
Mechanical	5083-M00	Title Sheet, Area of Work, Legends and Mechanical Drawing List
	5083-M01	HVAC New Work- Part Plan
	5083-M02	HVAC New Work and Schedules- Part Plan
	5083-M03	Plumbing and Utilities New Work- Part Plan
	5083-M04	Plumbing and Utilities New Work and Schedules- Part Plan
	5083-M05	Plumbing and Utilities New Work- Basement Part Plans, Plumbing and Utilities Demolition- Ground Floor Part Plan
	5083-E01	Lighting, Fire Alarm and Security Plan
	5083-E02	Power Service Plan
	5083-E03	Ground Floor Data Network Plan
	5083-E04	Single Line Diagram
	5083-E05	Ground Floor and Basement Demolition

1. SCOPE OF WORK

.1 Work under this contract covers the renovation of the ground floor, south wing in the Council's Building M-58 of the National Research Council.

2. DRAWINGS

.1 The following drawings illustrate the work and form part of the contract documents:

.1 5083-A00 COVER SHEET & KEY PLAN
.2 5083-A01 DEMOLITION PLAN FLOOR PLAN
.3 5083-A02 PLAN DETAILS – DEMOLITION
.4 5083-A03 SECTION DETAILS – DEMOLITION
.5 5083-A04 NEW FLOOR PLAN AND REFLECTED CEILING PLAN
.6 5083-A05 FURNITURE LAYOUT PLAN
.7 5083-A06 BUILDING SECTIONS – NEW CONSTRUCTION
.8 5083-A07 PLAN DETAILS - NEW CONSTRUCTION
.9 5083-A08 SECTION DETAILS – NEW CONSTRUCTION
.10 5083-A09 METAL CART AND WORKSTATION DETAILS – NEW CONSTRUCTION
.11 5083-A10 KITCHENETTE MILLWORK – NEW CONSTRUCTION
.12 5083-A11 FURNITURE MILLWORK – NEW CONSTRUCTION
.13 5083-A12 DOOR, WINDOW & ROOM FINISH SCHEDULE – NEW CONSTRUCTION
.14 5083-S01 STURCTURAL: GROUND FLOOR AND FIRST FLOOR PLANS AND DETAILS
.15 5083-M00 TITLE SHEET, AREA OF WORK, LEGENDS AND MECHANICAL DRAWING LIST
.16 5083-M01 HVAC NEW WORK – PART PLAN
.17 5083-M02 HVAC NEW WORK AND SCHEDULES – PART PLAN
.18 5083-M03 PLUMBING AND UTILITIES NEW WORK – PART PLAN
.19 5083-M04 PLUMBING AND UTILITIES NEW WORK AND SCHEDULES – PART PLAN
.20 5083-M05 PLUMBING AND UTILITIES NEW WORK – BASEMENT PART PLANS, PLUMBING AND UTILITIES DEMOLITION – GROUND FLOOR PART PLAN
.21 5083-E01 LIGHTING, FIRE ALARM AND SECURITY PLAN
.22 5083-E02 POWER SERVICE PLAN
.23 5083-E03 GROULD FLOOR NETWORK PLAN
.24 5083-E04 SINGLE LINE DIAGRAM
.25 5083-E05 GROUND FLOOR AND BASEMENT DEMOLITION

3. COMPLETION

.1 Complete all work within 12 weeks after receipt of notification of acceptance of tender.

4. GENERAL

.1 The word "provide" in this Specification means to supply and install.

.2 Provide items mentioned in either the drawings or the specification.

5. SPECIFIED ACCEPTABLE & ALTERNATIVE EQUIPMENT & MATERIALS

.1 Materials and equipment scheduled and/or specified on the drawings or in the specifications have been selected to establish a performance and quality standard. In most cases, acceptable manufacturers are stated for any material or equipment specified by manufacturer's name and model number. Contractors may base their tender price on materials and equipment supplied by any of the manufacturers' names as acceptable for the particular material or equipment.

.2 In addition to the manufacturers specified or named as acceptable, you may propose alternative manufacturers of materials or equipment to the Departmental Representative for acceptance. For a product to be considered as an alternative product substitute, make a written application to the Departmental Representative during the tender period, not later than ten (10) working days before tender closing.

.3 Certify in writing that the alternative meets all requirements of the specified material or equipment. In addition, it shall be understood that all costs required by or as a result of acceptance or proposed alternatives, will be borne by the contractor.

.4 Approval of alternatives will be signified by issue of an Addendum to the Tender Documents.

.5 Any alternative manufacturers or materials submitted which are incomplete and cannot be evaluated, or are later than ten (10) working days before tender closing date or after the tender period, will not be considered.

6. MINIMUM STANDARDS

.1 Conform to or exceed minimum acceptable standards of the various applicable federal, provincial and municipal codes such as The National Building Code, The National Fire Code, Canadian Plumbing Code, Canadian Electrical Code, Canadian Code for Construction Safety and the Provincial Construction Safety Act.

.2 Work to conform to referenced standards and codes as reaffirmed or revised to date of specification.

7. WORKPLACE HAZARDOUS MATERIAL INFORMATION SYSTEM (WHMIS)

.1 The general contractor shall comply with Federal and Provincial legislation regarding the WHMIS. The contractor's responsibilities include, but are not limited to the following:

.1 To ensure that any controlled product brought on site by the contractor or sub-contractor is labeled;

.2 To make available to the workers and the Departmental Representative, Material Safety Data Sheets (MSDS) for these controlled products;

.3 To train own workers about WHMIS, and about the controlled products that they use on site;

.4 To inform other contractors, sub-contractors, the Departmental Representative, authorized visitors and outside inspection agency personnel about the presence and use of such products on the site.

.5 The site foreman or superintendent must be able to demonstrate, to the satisfaction of the Departmental Representative, that he/she has had WHMIS training and is knowledgeable in its requirements. The Departmental Representative can require replacement of this person if this condition or implementation of WHMIS is not satisfactory.

8. REQUIREMENTS OF BILL 208, SECTION 18(a)

Under the requirements of Bill 208 of the Ontario Ministry of Labour Occupational Health & Safety Act, the following designated substances may be encountered while performing the work described in these contract documents:

.1 Acrylonitrile, Isocyanates, Arsenic, Lead, Asbestos, Mercury, Benzene, Silica, Coke Oven Emissions, Vinyl Chloride, and Ethylene Oxide

.1 It is the responsibility of the general contractor to ensure that each prospective subcontractor for this project has received a copy of the above list.

9. COST BREAKDOWN

.1 Submit, for approval by the Departmental Representative, a cost breakdown of tender 72 hours after the contract is awarded.

.2 Use the approved cost breakdown as the basis for submitting all claims.

.3 Request Departmental Representative's verbal approval to amount of claim prior to preparing and submitting the claim in its final form.

10. SUB-TRADES

.1 Submit no later than 72 hours after tender closing, a complete list of sub trades for the Departmental Representative's review.

11. PERSONNEL SECURITY AND IDENTIFICATION

.1 All persons employed by the contractor, or by any subcontractor and present on the site must be security cleared in accordance with the requirements of the Section entitled Special Instructions to Tenderers.

.2 All such persons must wear and keep visible identification badges as issued by the Security Office of NRC.

12. WORKING HOURS AND SECURITY

.1 Normal working hours on the NRC property are from 8:00 a.m. until 4:30 p.m., Monday to Friday inclusive, except statutory holidays.

.2 At all other times, special written passes are required for access to the building site.

~~.3~~ Before scheduling any work outside normal working hours, obtain permission from the Departmental Representative to perform the specific tasks.

.4 An escort may be required whenever working outside normal hours. Contractor to bear the associated costs.

13. SCHEDULE

.1 The contractor shall prepare a detailed schedule, fixing the date for commencement and completion of the various parts of the work and update the said schedule. Such schedule shall be made available to the Departmental Representative not later than two weeks after the award of the contract and prior to commencement of any work on site.

.2 Notify Departmental Representative in writing of any changes in the schedule.

.3 5 days before the scheduled completion date, arrange to do an interim inspection with the Departmental Representative.

14. PROJECT MEETINGS

.1 Hold regular project meetings at times and locations approved by the Departmental Representative.

.2 Notify all parties concerned of meetings to ensure proper coordination of work.

.3 Departmental Representative will set times for project meetings and assume responsibility for recording and distributing minutes.

15. SHOP DRAWINGS

.1 Submit to Departmental Representative for review, shop drawings, product data and samples specified within 2 weeks after contract award.

.2 Submit to Departmental Representative for review a complete list of all shop drawings, product data and samples specified and written confirmation of corresponding delivery dates within one (1) week after shop drawings, product data and samples approval date. This list shall be updated on a weekly basis and any changes to the list shall be immediately notified in writing to the Departmental Representative.

.3 Review shop drawings, data sheets and samples prior to submission.

.4 Submit electronic copy of all shop drawings and product data and samples for review, unless otherwise specified.

.5 Review of shop drawings and product data by the Departmental Representative does not relieve the contractor of the responsibility for errors and omissions and for the conformity with contract documents.

16. SAMPLES AND MOCK-UPS

.1 Submit samples in sizes and quantities as specified.

.2 Where colour, pattern or texture is criterion, submit full range of samples.

.3 Construct field samples and mock-ups at locations acceptable to Departmental Representative.

.4 Reviewed samples or mock-ups will become standards of workmanship and material against which installed work will be checked on the project.

17. MATERIALS AND WORKMANSHIP

.1 Install only new materials on this project unless specifically noted otherwise.

.2 Only first class workmanship will be accepted, not only with regard to safety, efficiency, durability, but also with regard to neatness of detail and performance.

18. WORK & MATERIALS SUPPLIED BY OWNER

.1 Work and materials not included in this contract are described on drawings and in this specification.

.2 Deliver to a storage place, as directed by the Departmental Representative, all materials returned to the Owner.

.3 Unless otherwise specified, accept owner-supplied materials at their storage location and provide all transportation as required.

.4 General Contractor's duties:

.1 Unload at site.
.2 Promptly inspect products and report damaged or defective items.
.3 Give written notification to the Departmental Representative for items accepted in good order.
.4 Handle at site, including uncrating and storage.
.5 Repair or replace items damaged on site.
.6 Install, connect finished products as specified.

19. SITE ACCESS

.1 Make prior arrangements with the Departmental Representative before starting work or moving materials and equipment on site.

.2 Obtain approval of Departmental Representative for regular means of access during the construction period.

.3 Obtain approval of Departmental Representative before temporarily suspending operations on site; before returning to the site and before leaving the site at the end of the job.

.4 Provide and maintain access to site.

.5 Build and maintain temporary roads and provide snow removal during period of work.

.6 Make good any damage and clean up dirt, debris, etc., resulting from contractor's use of existing roads.

20. USE OF SITE

.1 Restrict operations on the site to the areas approved by the Departmental Representative

.2 Locate all temporary structures, equipment, storage, etc., to the designated areas.

.3 Restrict parking to the designated areas.

21. ACCEPTANCE OF SITE

.1 Inspect the site before commencing work, review any unexpected conditions with the Departmental Representative.

.2 Commencement of work will imply acceptance of existing conditions.

22. SITE OFFICE & TELEPHONE

.1 Contractor to erect a temporary site office at his own expense.

.2 Install and maintain a telephone, if necessary.

.3 Use of NRC phones is not permitted unless in the case of an emergency.

23. SANITARY FACILITIES

.1 Obtain permission from the Departmental Representative to use the existing washroom facilities in the building.

24. TEMPORARY SERVICES

.1 A source of temporary power will be made available in the area. Bear all costs to make connections to the power source and perform distribution on site.

.2 Provide all load centres, breakers, conduit, wiring, disconnects, extension cords, transformers, as required from the source of power.

.3 Power is to be used only for power tools, lighting, controls, motors, and not for space heating.

.4 A source of temporary water will be made available if required.

.5 Bear all costs associated with distributing the water to the required locations.

.6 Comply with NRC requirements when connecting to existing systems in accordance with the articles entitled "Co-operation" and "Service Interruptions" of this section.

25. DOCUMENTS REQUIRED AT WORK SITE

.1 The contractor shall keep on the site, one (1) up-to-date copy of all contract documents, including specifications, drawings, addenda, shop drawings, change notices, schedule and any reports or bulletins pertaining to the work, in good order, available to the Departmental Representative and to his / her representatives at all times.

.2 At least one (1) copy of specifications and drawings shall be marked by the contractor to show all work "As Built" and shall be provided to the Departmental Representative with the Application for Payment and for the Final Certificate of Completion.

26. CO-OPERATION

.1 Co-operate with NRC staff in order to keep disruption of normal research work to an absolute minimum.

.2 Work out in advance, a schedule for all work which might disrupt normal work in the building.

.3 Have schedule approved by the Departmental Representative.

.4 Notify the Departmental Representative in writing, 72 hours prior to any intended interruption of facilities, areas, corridors, mechanical or electrical services and obtain requisite permission.

27. PROTECTION AND WARNING NOTICES

.1 Provide all materials required to protect existing equipment.

.2 Erect dust barriers to prevent dust and debris from spreading through the building.

.3 Place dust protection in the form of cover sheets over equipment and furniture and tape these sheets to floors, to ensure no dust infiltration.

.4 Repair or replace any and all damage to Owner's property caused during construction, at no cost to the Owner and to the satisfaction of the Departmental Representative.

.5 Protect the buildings, roads, lawns, services, etc. from damage which might occur as a result of this work.

.6 Plan and co-ordinate the work to protect the buildings from the leakage of water, dust, etc.

.7 Ensure that all doors, windows, etc., that could allow transfer of dust, noise, fumes, etc., to other areas of the building are kept closed.

.8 Be responsible for security of all areas affected by the work under the Contract until acceptance by NRC. Take all necessary precautions to prevent entry to the work area by unauthorized persons and guard against theft, fire and damage by any cause. Secure working area at the end of each day's work and be responsible for same.

.9 Provide and maintain adequate safety barricades around the work sites to protect NRC personnel and the public from injury during the construction.

.10 Post warnings, in all instances where possible injury could occur such as Work Overhead, Hard Hat Areas, etc. or as required by the Departmental Representative.

.11 Provide temporary protective enclosures over building entrances and exits to protect pedestrians. All enclosures to be structurally sound against weather and falling debris.

.12 Provide enclosure complete with ceiling between receiving door 6, man door 7 & freight elevator to allow for regular shipping/receiving operations during construction. Include 6' wide x 8' tall removable opening for the purposes of clause 27.13 below. Coordinate access to this area with NRC Departmental Representative when performing work within this area. Do not restrict access to this area for more than 2 days at a time.

.13 Provide access from receiving area through construction site for large deliveries from 8AM-10AM Monday, Wednesday and Friday throughout construction. Coordinate any limit to this access with NRC Departmental Representative.

28. BILINGUALISM

.1 Ensure that all signs, notices, etc. are posted in both official languages.

.2 Ensure that all identification of services called for by under this contract are bilingual.

29. LAYOUT OF WORK

.1 Location of equipment, fixtures, outlets and openings indicated on drawings or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with the manufacturer's recommendations for safety, access and maintenance.

.3 Employ competent person to lay out work in accordance with the contract documents.

30. DISCREPANCIES & INTERFERENCES

.1 Prior to the start of the work, examine drawings and specifications. Report at once to the Departmental Representative, any defects, discrepancies, omissions or interferences affecting the work.

.2 Contractor to immediately inform the Departmental Representative in writing, of any discrepancies between the plans and the physical conditions so the Departmental Representative may promptly verify same.

.3 Any work done after such a discovery, until authorized, is at the contractor's risk.

.4 Where minor interferences as determined by the Departmental Representative are encountered on the job and they have not been pointed out on the original tender or on the plans and specifications, provide offsets, bends or reroute the services to suit job conditions at no extra cost.

.5 Arrange all work so as not to interfere in any way with other work being carried out.

31. MANUFACTURER'S INSTRUCTIONS

.1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.

.2 Notify the Departmental Representative in writing of any conflict between these specifications and manufacturer's instruction. Departmental Representative will designate which document is to be followed.

32. TEMPORARY HEATING AND VENTILATING

.1 Bear the costs of temporary heat and ventilation during construction including costs of installation, fuel, operation, maintenance, and removal of equipment.

.2 Use of direct-fired heaters discharging waste products into the work areas will not be permitted unless prior approval is given by the Departmental Representative.

.3 Furnish and install temporary heat and ventilation in enclosed areas as required to:

.1 Facilitate progress of work.

.2 Protect work and products against dampness and cold.

.3 Reduce moisture condensation on surfaces to an acceptable level.

.4 Provide ambient temperature and humidity levels for storage, installation and curing of materials.

.5 Provide adequate ventilation to meet health regulations for a safe working environment.

.4 Maintain minimum temperature of 10 ^{o}C (50 ^{o}F) or higher where specified as soon as finishing work is commenced and maintain until acceptance by the Departmental Representative. Maintain ambient temperature and humidity levels as required for comfort of NRC personnel.

.5 Prevent hazardous or unhealthy accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction including also, storage areas and sanitary facilities.

.1 Dispose of exhaust materials in a manner that will not result in a harmful or unhealthy exposure to persons.

.6 Maintain strict supervision of operation of temporary heating and ventilating equipment.

.1 Enforce conformance with applicable codes and standards.

.2 Comply with instructions of the Departmental Representative including provision of full-time watchman services when directed.

.3 Enforce safe practices.

.4 Vent direct-fired combustion units to outside.

.7 Submit tenders assuming existing or new equipment and systems will not be used for temporary heating and ventilating.

.8 After award of contract, Departmental Representative may permit use of the permanent system providing agreement can be reached on:

.1 Conditions of use, special equipment, protection, maintenance, and replacement of filters.

.2 Methods of ensuring that heating medium will not be wasted and in the case of steam, agreement on what is to be done with the condensate.

.3 Saving on contract price.

.4 Provisions relating to guarantees on equipment.

33. CONNECTIONS TO AND INTERRUPTIONS TO EXISTING SERVICES

.1 Where work involves breaking into or connecting to existing services, carry out work at times and in the manner agreed to by the Departmental Representative and by authorities having jurisdiction, with minimum disruption to NRC Personnel and vehicular traffic and minimum service interruption. Do not operate any NRC equipment or plant.

.2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.

.3 Submit a schedule to and obtain approval from the Departmental Representative for any shut-down or closure of active service or facility; allow minimum 72 hours notice. Adhere to approved schedule and provide notice to the Departmental Representative.

.4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.5 Provide detours, bridges, alternate feeds, etc., as required to minimize disruptions.

.6 Protect existing services as required and immediately make repairs if damage occurs.

.7 Remove any abandoned service lines as indicated on the contract documents and as approved by the Departmental Representative; cap or otherwise seal lines at cut-off points.

Record and provide a copy to the Departmental Representative of locations of maintained, re-routed and abandoned service lines.

34. CUTTING AND PATCHING

.1 Cut existing surfaces as required to accommodate new work.

.2 Remove all items as shown or specified.

.3 Patch and make good with identical materials, the surfaces that have been disturbed, cut or damaged, to the satisfaction of the Departmental Representative.

.4 Where new pipes pass through existing construction, core drill an opening. Size openings to leave 12mm (1/2") clearance around the pipes or pipe insulation. Do not drill or cut any surface without the approval of the Departmental Representative.

.5 Obtain written approval of the Departmental Representative before cutting openings through existing or new structural members.

.6 Seal all openings where cables, conduits or pipes pass through walls with an acoustic sealant conforming to CAN/CGSB-19.21-M87.

.7 Where cables, conduits and pipes pass through fire rated walls and floors, pack space between with compressed glass fibres and seal with fire stop caulking in accordance with CAN/CGSB-19.13-M87 AND NBC 3.1.7.

35. FASTENING DEVICES

.1 Do not use explosive actuated tools, without first obtaining permission from the Departmental Representative.

.2 Comply with the requirements of CSA A-166 (Safety Code for Explosive Actuated Tools).

.3 Do not use any kind of impact or percussion tool without first obtaining permission from the Departmental Representative.

36. OVERLOADING

.1 Ensure that no part of the building or work is subjected to a load which will endanger safety or cause permanent deformation or structural damage.

37. DRAINAGE

.1 Provide temporary drainage and pumping as required to keep excavations and site free of water.

38. ENCLOSURE OF STRUCTURES

.1 Construct and maintain all temporary enclosures as required to protect foundations, sub-soil, concrete, masonry, etc., from frost penetration or damage.

.2 Maintain in place until all chances of damage are over and proper curing has taken place.

.3 Provide temporary weather tight enclosures for exterior openings until permanent sash and glazing and exterior doors are installed.

.4 Provide lockable enclosures as required to maintain the security of NRC facilities and be responsible for the same.

.5 Provide keys to NRC security personnel when required.

.6 Lay out the work carefully and accurately and verify all dimensions and be responsible for them. Locate and preserve general reference points.

.7 Throughout the course of construction, keep continuously acquainted with field conditions, and the work being developed by all trades involved in the project. Maintain an awareness of responsibility to avoid space conflict with other trades.

.8 Conceal all services, piping, wiring, ductwork, etc., in floors, walls or ceilings except where indicated otherwise.

39. STORAGE

.1 Provide storage as required to protect all tools, materials, etc., from damage or theft and be responsible for the same.

.2 Do not store flammable or explosive materials on site without the authorization of the Departmental Representative.

40. GENERAL REVIEW

.1 Periodic review of the contractor's work by the Departmental Representative does not relieve the contractor of the responsibility of making the work in accordance with contract documents. Contractor shall carry out his own quality control to ensure that the construction work is in accordance with contract documents.

.2 Inform the Departmental Representative of any impediments to the installation and obtain his / her approval for actual location.

41. INSPECTION OF BURIED OR CONCEALED SERVICES

.1 Prior to concealing any services that are installed, ensure that all inspection bodies concerned, including NRC, have inspected the work and have witnessed all tests. Failure to do so may result in exposing the services again at the contractor's expense.

42. TESTING

.1 On completion, or as required by local authority inspectors and/or Departmental Representative during progress of work and before any services are covered up and flushing is complete, test all installations in the presence of the Departmental Representative.

.2 Obtain and hand to the Departmental Representative all acceptance certificates or test reports from authority having jurisdiction. The project will be considered incomplete without the same.

43. PARTIAL OCCUPANCY

.1 NRC may request partial occupancy of the facility if the contract extends beyond the expected completion date.

.2 Do not restrict access to the building, routes, and services.

.3 Do not encumber the site with materials or equipment.

44. DISPOSAL OF WASTES

.1 Dispose of waste materials including volatiles, safely off NRC property. Refer to the section entitled "General and Fire Safety Requirements" included as part of this specification.

45. CLEAN-UP DURING CONSTRUCTION

.1 On a daily basis, maintain project site and adjacent area of campus including roofs, free from debris and waste materials.

.2 Provide on-site dump containers for collection of waste materials and rubbish.

46. FINAL CLEAN-UP

.1 Upon completion do a final clean-up to the satisfaction of the Departmental Representative.

.2 Clean all new surfaces, lights, existing surfaces affected by this work, replace filters, etc.

.3 Clean all resilient flooring and prepare to receive protective finish. Protective finish applied by NRC

47. WARRANTY AND RECTIFICATION OF DEFECTS IN WORK

.1 Refer to General Conditions "C", section GC32.

.2 Ensure that all manufacturers' guarantees and warranties are issued in the name of the **General** Contractor and the National Research Council.

48. MAINTENANCE MANUALS

.1 Provide three (3) bilingual copies of maintenance manuals or two English and two French maintenance manuals immediately upon completion of the work and prior to release of holdbacks.

.2 Manuals to be neatly bound in hard cover loose leaf binders.

.3 Manuals to include operating and maintenance instructions, all guarantees and warranties, shop drawings, technical data, etc., for the material and apparatus supplied under this contract.

END OF SECTION

1. GENERAL CONSTRUCTION SAFETY REQUIREMENTS

.1 The Contractor shall take all necessary steps to protect personnel (workers, visitors, general public, etc.) and property from any harm during the course of the contract.

.2 The Contractor shall be solely responsible for the construction safety of both its employees and those of its sub-contractors at the work site, and for initiating, maintaining and supervising safety precautions, programs and procedures in connection with the performance of the work.

.3 The Contractor shall comply with all Federal, Provincial and Municipal safety codes and regulations and the Occupational Health and Safety Act and the Workplace Safety and Insurance Board. In the event of any conflict between any provisions in legislation or codes, the most stringent provisions shall apply.

.4 Periodic review of the contractor's work by the Departmental Representative, using the criteria of the contract documents, does not relieve the contractor of his safety responsibilities in carrying out the work in accordance with the contract documents. The contractor shall consult with the Departmental Representative to ensure that this responsibility is carried out.

.5 The Contractor shall ensure that only competent personnel are permitted to work on site. Throughout the term of the contract, any person will be removed from the site who is not observing or complying with the safety requirements.

.6 All equipment shall be in safe operating condition and appropriate to the task.

.7 Following a project and site hazard assessment, the Contractor shall develop a Site Specific Safety Plan based on the following minimum requirements:

.1 Provide a safety board mounted in a visible location on the project site, with the following information included thereon:

.1 Notice of Project
.2 Site specific Safety Policy
.3 Copy of Ontario Health and Safety Act
.4 Building Schematic showing emergency exits
.5 Building emergency procedures
.6 Contact list for NRC, Contractor and all involved sub-contractors
.7 Any related MSDS sheets
.8 NRC Emergency phone number

.8 The Contractor shall provide competent personnel to implement its safety program and those of any Health and Safety Act legislation applicable at this project location, and to ensure they are being complied with.

.9 The Contractor shall provide safety orientation to all its employees as well as those of any subcontractors under its jurisdiction.

.10 The Departmental Representative will monitor to ensure that safety requirements are met and that safety records are properly kept and maintained. Continued disregard for safety standards can cause the contract to be cancelled and the Contractor or sub-contractors removed from the site.

.11 The Contractor will report to the Departmental Representative and jurisdictional authorities, any accident or incident involving Contractor or NRC personnel or the public and/or property arising from the Contractor's execution of the work.

.12 If entry to a laboratory is required as part of the work of the Contractor, a safety orientation shall be provided to all his employees as well as those of any subcontractors regarding lab safety requirements and procedures, as provided by the Researcher or the Departmental Representative.

2. FIRE SAFETY REQUIREMENTS

.1 Authorities

1. The Fire Commissioner of Canada (FC) is the authority for fire safety at NRC.
2. For the purpose of this document, "Departmental Representative" will be deemed as the NRC person in charge of the project and who will enforce these Fire Safety Requirements.
3. Comply with the following standards as published by the Office of the Fire Commissioner of Canada:
    a. Standard No. 301 - June 1982 "Standard for Construction Operations";
    b. Standard No. 302 - June 1982 "Standard for Welding and Cutting".

.2 Smoking

.1 Smoking is prohibited inside all NRC buildings, as well as roof areas.

.2 Obey all "NO SMOKING" signs on NRC premises.

.3 Hot Work

.1 Prior to commencement of any "Hot Work" involving welding, soldering, burning, heating, use of torches or salamanders or any open flame, obtain a Hot Work Permit from the Departmental Representative.

.2 Prior to commencement of "Hot Work", review the area of hot work with the Departmental Representative to determine the level of fire safety precautions to be taken.

.4 Reporting Fires

.1 Know the exact location of the nearest Fire Alarm Pull Station and telephone, including the emergency phone number.

.2 REPORT immediately, all fire incidents as follows:

.1 Activate nearest fire alarm pull station and;

.2 Telephone the following emergency phone number as appropriate:

FROM AN NRC PHONE	**333**
FROM ANY OTHER PHONE	**(613) 993-2411**

4. When reporting a fire by phone, give the location of fire, building number and be prepared to verify location.
5. The person activating fire alarm pull station must remain at a safe distance from the scene of the fire but readily available to provide information and direction to the Fire Department personnel.

.5 Interior and Exterior Fire protection & Alarm Systems

.1 DO NOT OBSTRUCT OR SHUT OFF FIRE PROTECTION EQUIPMENT OR SYSTEMS, INCLUDING BUT NOT LIMITED TO FIRE ALARM SYSTEMS, SMOKE/HEAT DETECTORS, SPRINKLER SYSTEM, PULL STATIONS, EMERGENCY CALL BUTTONS AND PA SYSTEMS, WITHOUT AUTHORIZATION FROM THE DEPARTMENTAL REPRESENTATIVE.

.2 WHEN ANY FIRE PROTECTION EQUIPMENT IS TEMPORARILY SHUT DOWN, ALTERNATIVE MEASURES AS PRESCRIBED BY THE DEPARTMENTAL REPRESENTATIVE SHALL BE TAKEN TO ENSURE THAT FIRE PROTECTION IS MAINTAINED.

.3 DO NOT LEAVE FIRE PROTECTION OR ALARM SYSTEMS INACTIVE AT THE END OF A WORKING DAY WITHOUT NOTIFICATION AND AUTHORISATION FROM THE DEPARTMENTAL REPRESENTATIVE. THE DEPARTMENTAL REPRESENTATIVE WILL ADVISE THE (FPO) OF THE DETAILS OF ANY SUCH EVENT.

.4 DO NOT USE FIRE HYDRANTS, STANDPIPES AND HOSE SYSTEMS FOR OTHER THAN FIRE FIGHTING PURPOSES UNLESS AUTHORISED BY DEPARTMENTAL REPRESENTATIVE.

.6 Fire Extinguishers

.1 Provide a minimum of 1-20 lb. ABC Dry Chemical Fire Extinguisher at each hot work or open flame location.

.2 Provide fire extinguishers for hot asphalt and roofing operations as follows:

a. Kettle area - 1-20 lb. ABC Dry Chemical;
b. Roof - 1-20 lb. ABC Dry Chemical at each open flame location.

.3 Provide fire extinguishers equipped as below:

c. Pinned and sealed;
d. With a pressure gauge;
e. With an extinguisher tag signed by a fire extinguisher servicing company.

.4 Carbon Dioxide (C02) extinguishers will not be considered as substitutes for the above.

.7 Roofing Operations

.1 Kettles:

.1 Arrange for the location of asphalt kettles and material storage with the Departmental Representative before moving on site. Do not locate kettles on any roof or structure and keep them at least 10m (30 feet) away from a building.

.2 Equip kettles with 2 thermometers or gauges in good working order; a hand held and a kettle-mounted model.

.3 Do not operate kettles at temperatures in excess of 232^{o}C (450 ^{o}F).

.4 Maintain continuous supervision while kettles are in operation and provide metal covers for the kettles to smother any flames in case of fire. Provide fire extinguishers as required in article 2.6.

.5 Demonstrate container capacities to Departmental Representative prior to start of work.

.6 Store materials a minimum of 6m (20 feet) from the kettle.

.2 Mops:

.1 Use only glass fibre roofing mops.

.2 Remove used mops from the roof site at the end of each working day.

.3 Torch Applied Systems:

.1 DO NOT USE TORCHES NEXT TO WALLS.

.2 DO NOT TORCH MEMBRANES TO EXPOSED WOOD OR CAVITY

.3 Provide a Fire Watch as required by article 2.9 of this section.

.4 Store all combustible roofing materials at least 3m (10 feet) away from any structure.

.5 Keep compressed gas cylinders a minimum of 6m (20 feet) away from the kettle, protected from mechanical damage and secured in an upright position.

.8 Welding / Grinding Operations

.1 Contractor to provide fire blankets, portable fume extraction devices, screens or similar equipment to prevent exposure to welding flash, or sparks from grinding.

.9 **Fire Watch**

.1 Provide a fire watch for a minimum of one hour after the termination of any hot work operation.

.2 For temporary heating, refer to General Instructions Section 00 010 00.

.3 Equip fire watch personnel with fire extinguishers as required by article 2.6.

.10 Obstruction of access/egress routes-roadways, halls, doors, or elevators

.1 Advise the Departmental Representative in advance of any work that would impede the response of Fire Department personnel and their apparatus. This includes violation of minimum overhead clearance, erection of barricades and the digging of trenches.

.2 Building exit routes must not be obstructed in any way without special permission from the Departmental Representative, who will ensure that adequate alternative routes are maintained.

.3 The Departmental Representative will advise the FPO of any obstruction that may warrant advanced planning and communication to ensure the safety of building occupants and the effectiveness of the Fire Department.

.11 Rubbish and Waste Materials

.1 Keep rubbish and waste materials to a minimum and a minimum distance of 6m (20 feet) from any kettle or torches.

.2 Do not burn rubbish on site.

.3 Rubbish Containers

.1 Consult with the Departmental Representative to determine an acceptable safe location for any containers and the arrangement of chutes etc. prior to bringing the containers on site.

.2 Do not overfill the containers and keep area around the perimeter free and clear of any debris.

.4 Storage

.1 Exercise extreme care when storing combustible waste materials in work areas. Ensure maximum possible cleanliness, ventilation and that all safety standards are adhered to when storing any combustible materials.

.2 Deposit greasy or oily rags or materials subject to spontaneous combustion in CSA or ULC approved receptacles and remove at the end of the work day or shift, or as directed.

.12 Flammable Liquids

.1 The handling, storage and use of flammable liquids is governed by the current National Fire Code of Canada.

.2 Flammable Liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres (10 imp gal), provided they are stored in approved safety cans bearing the ULC seal of approval and kept away from buildings, stockpiled combustible materials etc. Storage of quantities of

flammable liquids exceeding 45 litres (10 imp gal) for work purposes, require the permission of the Departmental Representative.

.3 Flammable liquids are not to be left on any roof areas after normal working hours.

.4 Transfer of flammable liquids is prohibited within buildings.

.5 Do not transfer flammable liquids in the vicinity of open flames or any type of heat producing device.

.6 Do not use flammable liquids having a flash point below 38 ^{o}C (100 ^{o}F) such as naphtha or gasoline as solvents or cleaning agents.

.7 Store flammable waste liquids for disposal in approved container located in a safe, ventilated area. Waste flammable liquids are to be removed from the site on a regular basis.

.8 Where flammable liquids, such as lacquers or urethane are used, ensure proper ventilation and eliminate all sources of ignition. Inform the Departmental Representative prior to, and at the cessation of such work.

3. Questions and/or clarifications

.1 Direct any questions or clarification on Fire or General Safety, in addition to the above requirements, to the Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA S350-M1980 (R1998), Code of Practice for Safety in Demolition of Structures.

1.2 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling.

1.3 SITE CONDITIONS

.1 Review "Designated Substance Report" and take precautions to protect environment.

.2 Should material resembling spray or trowel-applied asbestos or other designated substance listed as hazardous be encountered, stop work, take preventative measures, and notify Departmental Representative immediately.

.1 Do not proceed until written instructions have been received from Departmental Representative.

.3 Notify Departmental Representative before disrupting building access or services.

Part 2 Products

2.1 NOT USED

.1 Not used.

Part 3 Execution

3.1 PREPARATION

.1 Inspect building with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities within site in operating condition.

.3 Cooperate with and coordinate all trades in marking out required locations of floor and wall penetrations necessary to accommodate installation of new services.

.4 Disconnect, cap, plug or divert, as required, existing utilities within the property where they interfere or could be affected by the execution of work.

.1 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service designated to remain in place.

.2 Immediately notify Departmental Representative should uncharted utility or service be encounters, and await instruction in writing regarding remedial action.

3.2 PROTECTION

.1 Prevent movement, settlement, or damage to adjacent structures, utilities, and parts of building to remain in place. Provide bracing and shoring required.

.2 Keep noise, dust, and inconvenience to occupants to minimum.

.3 Protect building systems, services and equipment. Contractor to submit plans and details of all proposed temporary protection.

.4 Provide temporary dust screens, covers, railings, supports and other protection as required. Provide temporary protection to existing transformers, protection to be provided as required at commencement of each work shift and removed and stored at the end of each work shift.

.5 Do Work in accordance with Section 01 35 29.06 - Health and Safety Requirements.

3.3 DEMOLITION

.1 Remove parts of existing building where necessary to permit new construction.

3.4 CUTTING AND CORING

.1 Coordinate layout and marking of all required coring and cutting locations of existing slabs and walls with all sub-trades.

.2 Locate existing reinforcement and conduit before coring or cutting existing slabs and walls. Retain an independent testing company to locate existing reinforcement and conduit in the areas of proposed openings and to mark locations on the surfaces of slabs on which the cores and cuts are to be started. X-ray concrete unless other methods can be shown by Contractor to accurately locate reinforcement and conduit. Mark locations and sizes of cores and openings and locations of reinforcement and conduit using indelible markers with red for top bars, green for bottom bars and black for cores, openings and conduit.

.3 Coring: Do not cut existing reinforcement and conduit when coring existing concrete unless approved in advance by the Departmental Representative. Save the complete length of all cores. Label each core with location taken. Make all cores available for review by Departmental Representative. Dispose of cores only with approval of Departmental Representative.

.4 Cutting: Do not cut existing reinforcement and conduit when cutting existing concrete unless approved in advance by the Departmental Representative. Core the corners of all openings prior to cutting sides. Saw cut sides. Do not over cut openings. Chip corners square if necessary.

.5 Wet coring not acceptable in normally occupied areas of building.

.6 Carry out all cutting, coring, and drilling activities after normal business hours. Provide minimum 10 days notification to Departmental Representative for such work.

3.5 DISPOSAL

.1 Dispose of removed materials, to appropriate recycling facilities or reuse facilities except where specified otherwise, in accordance with authority having jurisdiction.

3.6 CLEANING

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International

.1 ASTM A53/A53M-07, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

.2 ASTM A307-07b, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 CSA International

.1 CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).

.3 CSA W59-M03(R2008), Welded Steel Construction (Metal Arc Welding).

.3 Green Seal Environmental Standards (GS)

.1 GS-11-2008, 2nd Edition, Paints and Coatings.

.4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

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

Part 2 Products

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W.

.2 Steel pipe: to ASTM A53/A53M standard weight, black finish.

.3 Welding materials: to CSA W59.

.4 Welding electrodes: to CSA W48 Series.

.5 Bolts and anchor bolts: to ASTM A307.

.6 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Shop coat primer for floor guards.

.2 Shop applied

2.4 ISOLATION COATING

.1 Isolate aluminum from following components, by means of bituminous paint:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.

.2 Concrete, mortar and masonry.

.3 Wood.

2.5 SHOP PAINTING RAILINGS

.1 Primer: VOC limit 250 g/L maximum.

.2 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.

.3 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7 degrees C.

.4 Clean surfaces to be field welded; do not paint.

2.6 PIPE RAILINGS

.1 Steel pipe: 38mm x 38mm nominal, formed to shapes and sizes as indicated.

2.7 CORNER GUARDS

.1 Surface Mounted Stainless Steel: 51mm x 51mm x 1219mm high.

.2 Acceptable Corner Guard Product: Canadian Builder’s Hardware CBH 450

2.8 METAL CARTS

.1 Metal sheet 1.37mm thick , as detailed.

.2 Cart Wheels; 100mm wheel diameter, 150kg capacity, 60mm full swivel raceway, 3mm thick mounting plate, 9mm wheel axel diameter, Acceptable Product – “Hamilton General Utility (300)”

.3 Shop applied paint finish; one coat zinc based primer, two coats epoxy coating, colour to Departmental Representative selection. Acceptable product: Sherwin Williams " Mocropoxy High Solids Epoxy Coating".

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Provide suitable means of anchorage acceptable to Departmental Representative such as, anchor clips, bar anchors, expansion bolts and shields, and toggles.

.4 Exposed fastening devices to match finish and be compatible with material through which they pass.

.5 Supply components for work by other trades in accordance with shop drawings and schedule.

.6 Touch-up rivets, field welds, bolts and burnt or scratched surfaces with primer after completion.

.7 Provide reinforcement to cart for attachment of castors to cart assembly.

3.3 PIPE RAILINGS

.1 Install pipe railings as indicated.

3.4 CORNER GUARDS

.1 Install corner guards in locations as indicated.

3.5 CLEANING

.1 Leave Work area clean at end of each day.

3.6 PROTECTION

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

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 08 52 00 Aluminum Windows.

1.2 REFERENCES

.1 CSA International

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.2 CSA O121-08, Douglas Fir Plywood.

.3 CSA O141-05(R2009), Softwood Lumber.

.4 CSA O151-09, Canadian Softwood Plywood.

.5 CAN/CSA-O325.0-07, Construction Sheathing.

.6 CAN/CSA-Z809-08, Sustainable Forest Management.

.2 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.3 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber 2010.

.4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1113-A2011, Architectural Coatings.

.5 Sustainable Forestry Initiative (SFI)

.1 SFI-2010-2014 Standard.

1.3 QUALITY ASSURANCE

.1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

.3 Plywood, OSB and wood based composite panel construction sheathing identification: by grademark in accordance with applicable CSA standards.

.4 Sustainable Standards Certification:

.1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

Part 2 Products

2.1 MATERIALS

.1 Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:

- .1 CAN/CSA-O141.
- .2 NLGA Standard Grading Rules for Canadian Lumber.
- .3 CAN/CSA-Z809 or FSC or SFI certified.

.2 Furring, blocking, nailing strips, grounds, rough bucks, fascia backing and sleepers:

- .1 S2S is acceptable for concealed locations.
- .2 Board sizes: "Standard" or better grade.
- .3 Dimension sizes: "Standard" light framing or better grade.
- .4 Post and timbers sizes: "Standard" or better grade.

.3 Panel Materials:

- .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
  - .1 Urea-formaldehyde free.
- .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
  - .1 Urea-formaldehyde free.
- .3 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.
  - .1 Urea-formaldehyde free.

.4 Wood Preservative:

- .1 Surface-applied wood preservative: coloured, copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

2.2 ACCESSORIES

.1 Fasteners: to CAN/CSA-G164, for exterior work, pressure- preservative and treated lumber.

.2 Nails, spikes and staples: to CSA B111.

.3 Bolts: 6 mm diameter unless indicated otherwise, complete with nuts and washers.

.4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, recommended for purpose by manufacturer.

.5 Explosive actuated fastening devices are not allowed.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for rough carpentry installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative and Consultant.

.2 Inform Departmental Representative and Consultant of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Treat surfaces of material with wood preservative, before installation.

.2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface for minimum 3 minute soak on lumber and 1 minute soak on plywood.

.3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

.4 Treat material as follows :

.1 Wood blocking, nailers, sleepers, around windows.

.2 Plywood around windows.

3.3 INSTALLATION

.1 Comply with requirements of NBC, supplemented by the following paragraphs.

.2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding and other work as required.

.3 Align and plumb faces of furring and blocking to tolerance of 1:600.

.4 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.

.5 Install wood blocking, nailers, sleepers and other wood supports as required and secure using galvanized steel fasteners.

.6 Install sleepers as indicated.

.7 Use caution when working with particle board. Use dust collectors and high quality respirator masks.

.8 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.

.9 Countersink bolts where necessary to provide clearance for other work.

3.4 CLEANING

.1 Leave Work area clean at end of each day.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI A208.2-09, Medium Density Fibreboard (MDF) for Interior Applications.

.2 ANSI/HPVA HP-1-2004, American National Standard for Hardwood and Decorative Plywood.

.2 Architectural Woodwork Manufacturers Association of Canada (AWMAC) and Architectural Woodwork Institute (AWI)

.1 Architectural Woodwork Quality Standards, 1st edition, 2009.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-11.3-M87, Hardboard.

.4 CSA International

.1 CSA B111-74(R2003), Wire Nails, Spikes and Staples.

.2 CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA O121-08, Douglas Fir Plywood.

.4 CSA O141-05, Softwood Lumber.

.5 CSA O151-09, Canadian Softwood Plywood.

.6 CSA O153-M1980(R2008), Poplar Plywood.

.5 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.2 FSC-STD-20-002-2004, Structure and Content of Forest Stewardship Standards V2-1.

.3 FSC Accredited Certified Bodies.

.6 National Lumber Grades Authority (NLGA)

.1 NLGA Standard Grading Rules for Canadian Lumber [2008].

.7 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards

.1 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for plywood, particleboard, OSB, MDF and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS.

.2 Shop Drawings:

.1 Indicate details of construction, profiles, jointing, fastening and other related details.

.2 Indicate materials, thicknesses, finishes and hardware.

.3 Samples:

.1 Submit for review and acceptance of each unit.

.2 Submit duplicate 300 x 300 mm samples of millwork panel materials and finishes.

1.3 QUALITY ASSURANCE

.1 Lumber by grade stamp of agency certified by Canadian Lumber Standards Accreditation Board (CLSAB).

.2 Plywood, particleboard, OSB and wood based composite panels to CSA and ANSI standards.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Storage and Handling Requirements:

.1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wood products from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Casework:

.1 Fabricate caseworks to AWMAC premium quality grade.

2.2 MATERIALS

.1 Laminated plastic for postforming work: to NEMA LD3.

.1 Type: postforming.

.2 Grade: 12 (HGP)

.3 Size: 0.9 mm thick.

.4 Colour: to be selected by Departmental Representative from standard colour range.

.2 Softwood lumber: S4S, moisture content 19% or less in accordance with following standards:

.1 CSA O141.
.2 NLGA Standard Grading Rules for Canadian Lumber.
.3 AWMAC premium grade, moisture content as specified.
.4 Machine stress-rated lumber is acceptable.
.5 Hardwood lumber: moisture content 9 % or less in accordance:
.1 National Hardwood Lumber Association (NHLA).
.2 AWMAC premium grade, moisture content as specified.

.3 Panel Material: Urea-formaldehyde free, maple veneer.

.1 FSC certified.
.2 Douglas fir plywood (DFP): to CSA O121, standard construction.
.3 Canadian softwood plywood (CSP): to CSA O151, standard construction.
.4 Hardwood plywood: to ANSI/HPVA HP-1.
.5 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m^3.

.4 Hardwood lumber: moisture content 8% or less in accordance with following standards:

.1 National Hardwood Lumber Association (NHLA).
.2 AWMAC custom grade, moisture content as specified.

.5 Stainless Steel counter top:

.1 Stainless steel sheet: to ASTM A167, Type 316, with type 4 finish.
.2 Stainless steel countertop fabrication;
.1 Stainless Steel thickness 1.3mm over 19mm core.
.2 Round or chamfer exposed edges and corners of cut-outs.
.3 Finish exposed counter top and backsplash at ends in stainless steel.
.4 Counter top surface to be integral to back splash.
.5 Grind all welds smooth.
.6 Fabricate countertop sections in as long length practicable.
.7 Secure countertop to base cabinet.

2.3 ACCESSORIES

.1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber.

.2 Wood screws: type and size to suit application.

.3 Splines: wood.

.4 Adhesive and Sealants: in accordance with Section 07 92 00 - Joint Sealants.

.1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.

2.4 PLASTIC LAMINATE FINISHING

.1 Comply with NEMA LD3, Annex A.

.2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.3 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.4 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 2400 mm. Keep joints 600 mm from sink cutouts.

.5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

.6 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.7 Apply laminated plastic liner sheet to interior of cabinetry.

2.5 WINDOW SILL

.1 Natural Quartz and Resin Composite window sill: Non-porous blend of natural quartz, 93 percent, and polyester resin, 7 percent, formed into flat slabs, self-supporting over structural members. Slab thickness 25mm, edge profile flat.

.1 Acceptable manufacture: Caesarstone Canada, and/or approved equal.

2.6 HARDWARE

.1 Acceptable manufacture: Richelieu Canada, and/or approved equal.

.1 Hinges; 120deg, full overlay, Richelieu #73T559180
.2 Shelf Standards and Shelf Support; Standard-16mm wide x 1.65mm thick, painted metal, slot adjustment. 11kg capacity shelf support.
.3 Door Pulls; Richelieu #54000140, chrome finish. 90mm center to center
.4 Drawer Slides: 3/4 extension, slide, 34kg capacity.
.5 Miscellaneous: door bumpers/pads, self adhering, clear colour.
.6 Grab Bars: 1.2mm thick, 32mm stainless steel, peened grip. 600mm straight and 760mmx760mm 90deg (Fitting Rm)
.7 Hooks: quantity-3, Richelieu #51128170AB, stainless steel (Fitting Room)

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for wood products installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.3 INSTALLATION

.1 Do finish carpentry to Quality Standards of (AWMAC), premium grade.

.2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.

.3 Form joints to conceal shrinkage.

3.4 CONSTRUCTION

.1 Fastening:

.1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.

.2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.

.3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round smooth cut hole and plug with wood plug to match material being secured.

.4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.

.2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.

.3 Shelving to cabinetwork to be adjustable unless otherwise noted.

.4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

.5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

.6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.7 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.8 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. Keep joints 600 mm from sink cutouts.

.9 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.

.10 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

.11 Apply laminate backing sheet to reverse side of core of plastic laminate work.

.12 Apply laminated plastic liner sheet to interior of cabinetry.

3.5 FINISHING

.1 Do finishing to wood veneer casework doors, drawer fronts, base cabinets to MPI interior painting systems. Shop finished spray applied.

.1 INT 6.4E Polyurethane finish, semi-gloss finish.

.2 Acceptable product; Minwax, or approved equal.

3.6 CLEANING

.1 Leave Work area clean at end of each day.

3.7 PROTECTION

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

.2 Repair damage to adjacent materials caused by finish carpentry installation.

END OF SECTION

Part 1 GENERAL N/A

Part 2 PRODUCTS

2.1 Insulation

.1 Sound batt insulation: fabricated from friction fit batts, mineral fibre, 90mm and 150mm thickness (thickness to fill stud cavity).

.2 Safe'n'Sound Fire & Soundproofing Insulation by Roxul Inc and / or approved equal.

Part 3 EXECUTION

3.1 Workmanship

.1 Install insulation after building substrate materials are dry.

.2 Install insulation to maintain continuity of acoustic insulation in wall construction.

.3 Fit insulation closely around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.5 Offset both vertical and horizontal joints in multiple layer applications.

.6 Do not enclose insulation until it has been inspected and approved by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 07 84 00 Firestopping

.2 Section 09 11 10 Metal Stud System

1.2 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 CAN-ULC-S101-04, Standard Methods of fire Endurance Tests of Building Construction and Materials.

.2 CAN-ULC-S102-03, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets

.2 Samples: submit duplicate 300 x 300 mm size sample of exposed fireproofing for approval of texture and colour.

.3 Quality assurance submittals: submit,

.1 Test Reports:

.1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.

.2 Submit test results in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

.3 For assemblies not tested and rated, submit proposals based on related designs using accepted fireproofing design criteria.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company specializing in sprayed-on fireproofing approved by manufacturer with 5years documented experience.

.2 Mock-ups:

.1 Apply fireproofing to approximately 10 m^2 area of surface to be treated.

.2 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.3 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with fireproofing work.

.4 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

.3 Site Meetings:

.1 Convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Departmental Representative.

.1 Verify Project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

1.6 AMBIENT CONDITIONS

.1 Ensure that 5 degrees C air and substrate temperature is maintained during and for 24 hours after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.

.2 Maintain relative humidity within limits recommended fireproofing manufacturer.

.3 Ensure that natural ventilation to properly dry fireproofing during and subsequent to its application is provided.

.4 In enclosed areas lacking openings for natural ventilation, provide minimum of 4 air exchanges per hour by forced air circulation.

Part 2 Products

2.1 MATERIALS

.1 Sprayed fireproofing: ULC certified cementitious fireproofing qualified for use in ULC Designs specified. Acceptable product: AD Fire Protection Systems-Type 5GP.

.2 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.

.3 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified. Acceptable product: AD Fire Protection Systems Type-TC-55 Sealer.

.1 Colour: white.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

.1 Substrate: free of material, which would impair bond.

.2 Verify that painted substrates are compatible and have suitable bonding characteristics to receive fireproofing.

.3 Remove incompatible materials.

.4 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.

.5 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

3.3 APPLICATION

.1 Apply bonding adhesive or primer to substrate.

.2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings;

.1 Steel Columns; 2 hrs fire rating – ULC Design No X813

.2 Steel floor decks and beams: 2 hrs fire rating – ULC Design No810

.3 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density and texture.

.4 Apply curing compound to surface of cementitious fireproofing as required by manufacturer.

.5 Apply sealer to surface of fireproofing (fireproofing is to be painted).

3.4 SCHEDULE

.1 Apply new fireproofing to existing columns, beams and underside of steel deck at ground floor south wing of building M-58 between grids P2 to Z2 and 15 to 19.

3.5 PATCHING

.1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before final inspection.

3.6 CLEANING

.1 Clean surfaces not indicated to receive fireproofing of sprayed material within 24 hours period after application.

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Division 22 – Plumbing.

.2 Division 23 – Heating, Ventilating and Air-Conditioning.

.3 Division 26 – Electrical.

1.2 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.3 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of non-combustible construction or have "0" annular space in buildings of combustible construction.

.1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.4 SUBMITTALS

.1 Provide Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.2 Shop Drawings:

.1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.

.2 Construction details should accurately reflect actual job conditions.

.3 Quality assurance submittals: submit following.

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.

.4 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

.2 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, and ULC markings.

.2 Storage and Protection:

.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.3 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling.

Part 2 Products

2.1 MATERIALS

.1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.

.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended

.2 Fire stop system rating: 2-hours.

.2 Service penetration assemblies: systems tested to CAN-ULC-S115.

.3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.10 Sealants for vertical joints: non-sagging.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.

.1 Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed by Departmental Representative.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: certified fire stop system component.

.1 Ensure pipe insulation installation precedes fire stopping.

3.4 FIELD QUALITY CONTROL

.1 Inspections: notify Departmental Representative when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.5 CLEANING

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

.2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.6 SCHEDULE

.1 Fire stop and smoke seal at:

.1 Penetrations through fire-resistance rated masonry, concrete, and gypsum board partitions and walls.

.2 Edge of floor slabs at curtain wall and precast concrete panels.

.3 Top of fire-resistance rated masonry and gypsum board partitions.

.4 Intersection of fire-resistance rated masonry and gypsum board partitions.

.5 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.

.7 Openings and sleeves installed for future use through fire separations.

.8 Around mechanical and electrical assemblies penetrating fire separations.

.9 Rigid ducts: greater than 129 cm^2: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

END OF SECTION

Part 1 GENERAL

1.1 General

.1 One manufacturer's product only to be used throughout.

.2 Sealant must be approved by Departmental Representative as acceptable product.

.3 Colours of all sealants to be selected by the Departmental Representative prior to proceeding.

Part 2 PRODUCTS

2.1 Materials

.1 Type 1-Multi-purpose sealant: Acrylic latex one part: to CAN/CGSB-19.17. approved by Departmental Representative.

.2 Type 2-Acoustic sealant: Synthetic Rubber Sealant, "Tremco Acoustical Sealant" or equivalent approved by Departmental Representative.

.3 Type 3-Single Component Silicone: "Tremco Spectrum 1" or equivalent approved by Departmental Representative.

.4 Preformed compressible and non-compressible back-up materials:

- .1 Polyethylene, urethane, neoprene or vinyl foam:
  - .1 Extruded: closed cell foam backer rod.
  - .2 Size: oversize to 30%.
- .2 Bond breaker tape:
  - .1 Polyethylene bond breaker tape which will not bond to sealant.

.4 Primers: sealant manufacturer's type.

.5 Cleaners: as recommended by sealant manufacturers.

.6 Sealant Colour: to Departmental Representatives selection from standard colour range.

2.2 Sealant Selection

.1 Type-1; Perimeters of interior door frames.

.2 Type-2; At base along bottom track of partitions.

.3 Type-3; Perimeter of windows on exterior and interior side

Part 3 EXECUTION

3.1 Preparation

.1 Ensure all materials which will bear sealant on their surfaces are clean and free from foreign material which would affect bonding.

.2 Permit concrete and mortar to cure fully before sealing.

.3 Prime joint sides in accordance with manufacturer's directions.

.4 Mask adjacent surfaces to prevent contamination by sealant. Remove mask immediately after joints completed.

.5 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.6 Ensure joint surfaces are dry and frost free.

3.2 Backup Material

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.3 Application

.1 Sealant:

.1 Apply sealant in accordance with manufacturer's written instructions.
.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
.3 Apply sealant in continuous beads.
.4 Apply sealant using gun with proper size nozzle.
.5 Use sufficient pressure to fill voids and joints solid.
.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
.7 Tool exposed surfaces before skinning begins to give slightly concave shape.
.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing:

.1 Cure sealants in accordance with sealant manufacturer's instructions.
.2 Do not cover up sealants until proper curing has taken place.

3.4 CLEANING

.1 Leave Work area clean at end of each day.

.1 Clean adjacent surfaces immediately.
.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION

Part 1 GENERAL

1.1 Related Requirements

.1 Section 08 71 00 – Finish Hardware

.2 Section 08 80 00 - Glazing

1.2 Shop Drawings

.1 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners openings, glazed.

Part 2 PRODUCTS

2.1 Hollow Metal Doors

.1 Steel: zinc coated .25 oz zinc per square foot content to ASTM A527.

.2 Flat sheet: face and back skins to be 18 (1.0mm) gauge thickness.

.3 Door Core:

.1 Honeycomb: structural core consisting of kraft paper having 20mm cell size to thickness indicated.

.4 Hardware reinforcement: hinges 7 (3.7mm) gauge, lock box, closer mounting, 14 (1.6mm) gauge.

.5 Top and bottom channels closures: 14 (1.6mm) gauge.

.6 Primer: for touch-up zinc chromate CAN/CGSB-1.132-M90.

2.2 Materials Pressed Steel Frames

.1 Steel; zinc coated .25 oz zinc per square foot content to ASTM A527.

.2 All components; headers, jambs, screen stiles to be 16 (1.3mm) gauge thickness.

.3 Hardware reinforcement; minimum 7 (3.7mm) gauge for hinge plates min. 16 (1.3mm) gauge for closer mounting, panic sets, cylindrical and mortised locksets.

.4 Glazing stops: min. 20 (0.8mm) gauge.

.5 Temporary channel spreaders; min. 1.6mm (1/16").

.6 Guard and dust boxes; 0.8mm (0.031") thick.

.7 All anchors; drywall and masonry 18 (1.0mm) gauge, tube and screw 3/16" (5mm) dia. screws and 3/8" (10mm) dia. for labelled frames.

.8 Door bumpers; pressure fit black neoprene.

.9 Angle clips; min. 20 (0.8mm) gauge.

.10 Primer: for touch-up zinc chromate CAN/CGSB-1.132-M90.

Part 3 EXECUTION

3.1 Fabrication

.1 Prior to fabrication take critical measurements at site to facilitate installation and fitting of doors.

.2 Blank, drill, reinforce and tap frames to receive templated strikes, door closers and hinges.

.3 Cut frames, mitre accurately and form continuous invisible welds inside profile.

.4 Grind welded corners, fill exposed surface depressions and butted joints with metallic paste filler and sand to a smooth uniform finish.

.5 Protect strikes and hinges by guard boxes welded in place.

.6 Reinforce door transoms and heads for openings larger than 5'-0" (1500mm) with light structural section or as indicated.

.7 Fabricate doors as integral units, free from sag, distortion, wave or core ghosting, with slide interlocking edge seams.

.8 Bond steel sheets to approved core material. Fill voids in stiles with polyurethane.

.9 Welding of door and frame components in accordance with CSA W59-M1989.

.10 Fabricate thermally broken frames for exterior doors using steel core, separating exterior portion of frame from interior portion with polyvinyl chloride thermal breaks.

3.2 Installation

.1 Provide each door frame with two rubber door silencers at head of each door, and three at the strike side.

.2 Provide two channel or angle spreaders per frame to ensure proper alignment. Where frames terminate at finished floor, provide angle clips for anchorage to slab.

.3 Provide six adjustable anchors for seven feet height of frames.

.4 Obtain hardware templates. Cut, blank-out, reinforce and drill all members accurately to receive hardware. Provide locating clips for mortise locks.

.5 Secure physical metal fire label, by means of pop rivets on labelled fire doors and frames. Label to carry qualifications of rating in accordance to Underwriters or Warnock-Hersey standards. Locate labels on hinge rebate of frames and hinge end of doors.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Division 26 - Electrical

1.2 REFERENCES

.1 Aluminum Association (AA)

.1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.

.2 American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA)

.1 ANSI/BHMA A156.19-2007, Power Assist and Low Energy Power Operated Doors.

.3 ASTM International

.1 ASTM A167-99(R2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.

.2 ASTM B209M-07, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

.3 ASTM B221M-07, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).

.4 ASTM D2000-08, Classification System for Rubber Products in Automotive Applications.

.4 CSA International

.1 CAN/CSA-A440-00, Windows /Special Publication A440.1-00(R2005), User Selection Guide to CSA Standard CAN/CSA-A440-00, Windows.

.5 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S533-08, Egress Door Securing and Releasing Devices.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Arrange for site visit with Departmental Representative prior to start of Work to examine existing site conditions.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for doors, hardware, and accessories and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Shop Drawings:

.1 Indicate layout, dimensions, elevations, detail sections of members and sill conditions, materials, finishes, recesses, hardware including mounting heights,

anchors and reinforcements, provisions for expansion and contraction, methods of joining sheet metal and joint locations, glass types and glass thicknesses, glazing details, types of sealants, details of other pertinent components of the work, and adjacent construction to which work of this section is attached.

.2 Identify installation tolerances required, assembly conditions, routing of service lines, locations of operating components, controls and boxes.

.3 Indicate door signs.

1.5 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data for for incorporation into manual.

.2 Parts List:

.1 Submit manufacturer's parts lists ; include servicing frequencies, instructions for adjustment and operation applicable to each type of component or hardware, and name, address and telephone number of nearest authorized service representative.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Supply wrenches and tools required for maintenance of equipment.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.2 Cover exposed metal surfaces with pressure sensitive heavy protection paper or strippable plastic coating.

.1 Use materials of type which will not leave residue or become bonded when exposed to sun.

.2 Use padded blankets or approved protective wrapping for decorative metal work and similarly finished exposed elements.

1.8 WARRANTY

.1 Contractor hereby warrants that automatic doors will function as specified in accordance with CCDC 24, but for 60 months.

.2 Warranty: include coverage of repair or replacement of components or entire units which fail in materials workmanship. Failures include but are not necessarily limited to, structural failures including excessive deflection, excessive leakage or air infiltration, faulty operation of operators [speed control] and hardware, deterioration of metals, metal finishes, and other materials beyond normal weathering.

Part 2 Products

2.1 SYSTEMS

.1 Design Requirements:

.1 Design automatic entrances to comply with applicable requirements of ANSI/BHMA A156.10.

.2 Design power assist and low energy power operated doors to applicable requirements of ANSI/BHMA A156.19.

.2 Performance Requirements:

.1 Automatic door equipment to accommodate medium frequency pedestrian traffic and weight of doors.

.2 Operator Equipment: CSA approved.

.3 Design framing members to withstand their own weight, weight of glass, loads imposed by motion of operable elements, and design wind and suction loads, as calculated in accordance with applicable code and applicable municipal regulations, to maximum allowable deflection of 1/175 of span, when tested in accordance with ASTM E330.

.4 Include expansion joints to accommodate movement in door, door frame and screen framing system, and between system and building structure, caused by structural movements, and dynamic loading and release of loads, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.

.5 Design for dimensional distortion of components during operation.

.6 Prevent condensation in pneumatic lines.

.7 Supply manual operation for opening and closing of doors during electrical power failure and when power is manually switched off.

.8 Include fully adjustable operators for opening and closing speeds and hold open time.

.9 Supply framing members and finished metal sheets with uniform appearance and colour.

2.2 AUTOMATIC DOOR SYSTEM

.1 Automatic Door Equipment: with motion detector and presence sensor control device.

.2 Type of Door Operations: fully automatic, power assist, low energy power operated and manual. On receipt of signal from building fire alarm and smoke detection systems, door will operate manually or remain open.

.3 Door: bi-parting sliding

.4 Traffic Movement: two way traffic.

.5 Photo eye motion sensor operated door opening from Main Printing Space Rm 108 side. Card Reader operated door opening from Loading Dock Rm 109 side.

2.3 MATERIALS

.1 Aluminum Door system acceptable product: Stanley “Dura-Glide 2000” or approved equal.

.2 Framing finish: anodized aluminum

2.4 GLASS AND GLAZING MATERIALS

.1 Glass Schedule:

.1 Door Lights: single pane 6mm thick tempered glass.

2.5 AUTOMATIC OPERATORS

.1 Visibly mounted, overhead operator for accommodating door action.

.2 Fully adjustable without removal of doors. Supply adjustable speed control for checking opening, closing and length of time door remains open.

.3 Supply connections for power and control wiring.

.4 Equip operators with current characteristics to suit building's electrical service.

2.6 DOOR OPERATOR CONTROL SYSTEMS

.1 Supply controls with detection patterns and sensitivity, for both operation and safety, of sizes and quantities required to suit project, but not smaller than requirements of ANSI/BHMA A156.10.

.2 Motion Detecting Control System.

.1 Motion Detector: manufacturer's standard, self contained.

.2 Presence Sensor: manufacturer's standard, self contained.

.3 Electrical Interfaces: supply devices which prevent activation of operator when door is locked, latched or bolted.

.4 Sliding Door Opening Width Control Switch: two position switch which in normal position permits sliding doors to open full width and in alternate position reduces opening to selected partial opening width.

2.7 FABRICATION

.1 Include reinforcement for strength, stiffness and connections. Separate metal surfaces at moving joints with non-metallic separators to prevent lock-up of joints. Use structural steel channel sections within void space of framing sections as required.

.2 Fit intersecting members to flush hairline joints and mechanically fasten or weld together, except where indicated otherwise. Grind welds smooth, flush and finish to match adjacent surfaces. Reinforce mechanically joined corners of doors by welding and spigotting or by one piece cast aluminum angle to produce sturdy door unit.

.3 Conceal fastenings from view. Exposed fastenings where specified or indicated.

.4 Form cut-outs, recesses, mortising or milling for finishing hardware and operators to templates supplied. Reinforce with aluminum or galvanized steel.

.5 Field apply isolation coating to aluminum, galvanized steel or prime coated steel in contact with dissimilar metals, and cementitious materials. Touch-up damaged or scratched surfaces or steel with appropriate primer.

.6 Shop install replaceable weatherstripping at exterior doors and vestibule door openings, in stiles, head and sill rails. Adjust to prevent door from closing incorrectly, or to prevent binding.

.7 Fabricate doors, frames and screens by same manufacturer.

.8 Construct doors, frames and screens from aluminum porthole extrusions.

.9 Include interlocking snap-in type glazing stops for dry glazing. Use tamper proof type exterior stops.

.10 Shop install hardware, except surface mounted hardware. Remove only as required for final finishing operations, and for delivery and installation of work at project site.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for automatic entrances installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative..

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Install doors, frames and screens in accordance with manufacturer's instructions.

.3 Co-ordinate installation of components with related and adjacent work.

.4 Set work plumb, square, level, free from warp, twist and superimposed loads.

.5 Securely anchor work in required position.

.6 Brace frames rigidly for building-in. Supply temporary horizontal spreaders at third points of door openings to maintain frame width. Vertically support at centre, heads of openings over 1.2 m wide. Remove temporary bracing after framing is set.

.7 Apply isolation coating to separate aluminum and primed or galvanized steel surfaces at points of contact with cementitious materials.

.8 Maintain clearances between head members and structure to ensure that structural loads are not transmitted to frames.

.9 Install door operator system in accordance with manufacturer's instructions, including piping controls, control wiring.

.10 Set tracks, header assemblies, operating brackets, rails and guides level and true to location, with adequate anchorage for permanent support.

3.3 ADJUSTING

.1 After repeated operation of completed installation equivalent to three days of use by normal traffic (100 to 300 cycles), readjust door operators and controls for optimum, smooth operating condition and safety. Lubricate hardware, operating equipment and other moving parts.

3.4 CLEANING

.1 Progress Cleaning:

.1 Leave Work area clean at end of each day.

.2 Remove traces of primer, caulking; clean doors and frames.

.3 Clean aluminum surfaces promptly after installation. Exercise care to avoid damage to coatings.

.4 Clean glass and glazing materials with approved non-abrasive cleaner.

.5 Remove protective material from prefinished aluminum surfaces.

.6 Wash exposed surfaces with mild solution of detergent and warm water, using soft, clean wiping cloths. Remove dirt from corners. Wipe surfaces clean.

.7 Remove excess sealant by moderate use of solvent, of type acceptable to sealant manufacturer.

3.5 DEMONSTRATION

.1 Demonstrate operation, operating components, adjustment features, and lubrication requirements to Owner.

3.6 PROTECTION

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

.2 Repair damage to adjacent materials caused by aluminum door and frame installation.

END OF SECTION

Part 1 GENERAL

1.1 Related Work

.1 Caulking of joints between frames and other building components: Section 07 90 00-Sealants.

.2 Glass units: Section 08 80 00 - Glazing.

.3 Window Sills: Section 06 20 00 Finish Carpentry.

1.2 REFERENCES

.1 Aluminum Association (AA)

.1 Designation System for Aluminum Finishes (2003).

.2 CSA International

.1 CSA-A440-00/A440.1-00(R2005), A440-00, Windows / Special Publication A440.1-00, User Selection Guide to CSA Standard A440-00, Windows. CAN/CSA-A440.2-09, Fenestration Energy Performance.

.2 CAN/CSA-Z91-02(R2008), Health and Safety Code for Suspended Equipment Operations.

1.3 Scope of Work

.1 Provide glazed fixed window units into the curtain wall framing system specified in this section and flashing.

1.4 Samples

.1 Submit one representative model of each type aluminum window in accordance with Section 01000.

.2 Show frame, glazing and weatherproofing method, and surface finish. Include 150 mm (6") long samples of head, jamb, meeting rail, mullions and flashings to indicate profile.

1.5 QUALITY ASSURANCE

.1 Mock-ups:

.1 Construct one mock-up of entire window assembly including; glass units, head, jambs, intermediate mullions, flashing, caulking and spandrel assembly.

.1 Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, flashing, and perimeter sealant.

.2 Locate mock-up where indicated Departmental Representative.

.3 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with work.

.4 When accepted, mock-up will demonstrate minimum standard of quality and materials for work of this Section.

.5 Mock-up may remain as part of finished work.

1.6 Shop Drawings

.1 Submit drawings stamped and signed by professional Departmental Representative registered or licensed in the Province of Ontario, Canada

.2 Clearly indicate materials and large scale details for head, jamb, profiles of components, elevations of unit, anchorage details, junction between combination units (i.e. curtain wall), location of isolation coating, description of related components and exposed finishes, fasteners and caulking.

1.7 Test Reports

.1 Submit test reports from approved independent testing laboratories, certifying compliance with specifications, in accordance with CAN/CSA-A440-00, for:

.1 Window type and classification specified.
.2 Anodized aluminum finish.
.4 Air tightness: A3.
.5 Water tightness:B7.
.6 Wind load resistance:C5.
.7 Condensation resistance: I=55.

1.8 Maintenance Data

.1 Provide maintenance data for cleaning and maintenance of aluminum windows for incorporation into maintenance manual.

1.9 Protection

.1 After erection, protect finished work from damage of other trades with 6 mil polyethylene and cardboard, and as directed by Departmental Representative.

.2 Leave protective covering in place until final cleaning of building.

1.10 Warranty

.1 For work of this section, the 12 months warranty period prescribed in subsection GC 32.2 of General Conditions "C" is extended to 60 months.

.2 For insulated glass units, refer to Section 08 80 00-Glazing.

Part 2 PRODUCTS

2.1 Systems

.1 Description:

.1 Fixed window units includes thermally broken tubular aluminum sections with self supporting framing, shop fabricated, factory prefinished, vision glass, insulated metal panel infill with covers; related flashings, anchorage and attachment devices.

.2 Assembled system to permit re-glazing of individual glass units from exterior without requiring removal of structural mullion sections.

.2 Performance Requirements:

.1 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with NBC.

.2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with applicable codes.

.3 Limit mullion deflection to flexure limit of glass.

.4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.

.5 Ensure system is designed to accommodate the following without damage to components or deterioration of seals:

.1 Movement within system.

.2 Movement between system and perimeter framing components.

.3 Dynamic loading and release of loads.

.4 Deflection of structural support framing.

.5 Shortening of building concrete structural columns.

.6 Creep of concrete structural members.

.7 Mid-span slab edge deflection.

.6 Limit air infiltration through assembly to 0.0003 $m^3/s/m^2$ of wall area, measured at a reference differential pressure across assembly of 75Pa as measured in accordance with AAMA 501and ASTM E283.

.7 Vapour seal with interior atmospheric pressure of 25 mm sp, 22 degrees C, 40% RH: no failure.

.8 Water leakage: none.

.9 Ensure system allows for expansion and contraction within system components when temperature range is 95 degrees C over 12 hour period without causing detrimental affect to system components.

.10 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior by weep drainage network.

.11 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

.1 Position thermal insulation on exterior surface of air barrier and vapour retarder.

.12 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

.3 Acceptable products from following manufacturers:

.1 Kawneer Company Canada Ltd – 1600 Curtain Wall System
.2 Alumicor Ltd – 2500 Curtain Wall System
.3 Or equivalent approved by the Departmental Representative.

.4 Aluminum extrusions: Aluminum Association alloy AA6063-T5.

.5 Materials: to CAN/CSA-A440-00 supplemented as follows:

.6 Glass and glazing materials: in accordance with Section 08 80 00.

.7 Sealant within window member assembly: in accordance with window manufacturer, colour to match aluminum profiles.

.8 Isolation coating: alkali resistant bituminous paint.

.9 Bedding compound: to 19-GP-14M.

2.2 Aluminum window frame Components

.1 Mullion profile:

.1 Vertical members: 2-1/2” (63.5mm) x (6 1/2” – 8” (164 -200mm)) nominal overall dimension.

.2 Horizontal members: 2-1/2”(63.5mm) x (6 1/2” – 8” (164 -200mm)) nominal overall dimension.

.3 Snap cap cover: 1-1/4” (32mm) deep x 2-1/2”(63.5mm)

.4 Thermally broken with interior tubular section insulated from exterior pressure plate.

.5 Matching stops and pressure plate of sufficient size and strength to ensure adequate bite on glass and infill panels.

.6 Drainage holes, deflector plates and internal flashings to accommodate internal weep drainage system.

.7 Internal mullion baffles to eliminate "stack effect" air movement within internal spaces.

.2 Infill panel: internally reinforced, glazing edge sealed.

.1 Outer face: 1.8mm thick aluminum.

.2 Inner face: 1.8mm anodized aluminum.

.3 Core: semi-rigid insulation core with RSI of 2.96, Roxul CurtainRock or equal.

.3 Backpan: 1.5mm galvanized sheet material.

.4 Sill Flashings: 1.8mm thick anodized aluminum finish to match window mullion sections, profile as detailed.

.5 Sill Flashing Upturn Termination: 50mm x 50mm x 1.8mm thick anodized aluminum finish to match window mullion sections.

.6 Flashing Securement Clips: 1.8mm thick anodized aluminum finish to match window mullions.

.7 Classification rating (on site): to CAN/CSA-A440:

.1 Air tightness: A3.
.2 Water tightness: B3.
.3 Wind load resistance: C3.
.4 Condensation resistance: Temperature Index, I=55.

.8 The Departmental Representative may conduct tests "in situ".

.1 The Departmental Representative will pay for associated testing costs.
.2 If testing indicates unsatisfactory performance, revise the design as required and re-test.
.3 All associated costs for re-testing to be borne by manufacturer.

2.3 Fabrication

.1 Fabricate in accordance with CAN/CSA-A440-00 supplemented as follows:

.2 Fabricate window units square and true with maximum tolerance of plus or minus 1.5 mm (1/16") for units with diagonal measurement of 1800 mm (6'-0") or less, and plus or minus 3 mm (1/8") for units with diagonal measurement over 1800 mm (6'-0").

.3 Brace sash frames to maintain squareness and rigidity during shipment and installation.

.4 Finish steel clips and reinforcement with shop coat primer to CAN/CGSB-1.40-97 380 g/m² zinc coating to CAN/CSA-G164-M92 (R1998).

.5 Manufacturer's nameplates on windows are not acceptable.

2.4 Finishes

.1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes-1980.

.1 Electrolytically deposited colour anodic finish: Clear anodic finish: designation AA-A31, with a minimum coating thickness of 10 microns (0.4 mil).
.2 Appearance and properties of anodized finishes as designated by the Aluminum Association as Architectural Class 2.

2.5 Isolation Coating

.1 Isolate aluminum from following components, by means of isolating coating:

.1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
.2 Concrete, mortar and masonry.

2.6 Glazing

.1 Glaze windows with insulating glass units in accordance with CAN/CSA-440-00 and Section 08 80 00.

.2 Prepare frames to accommodate glass and glazing method specified in Section 08 80 00.

Part 3 EXECUTION

3.1 Window Installation

.1 Install in accordance with CAN/CSA-A440-00.

.2 Arrange components to prevent abrupt variation in colour.

.3 Make allowance for deflection of structure. Ensure that structural loads are not transmitted to windows.

.4 Install sill flashing full width of window and extend over exterior finish as detailed. Provide clips to secure sill flashing and secure clips in place.

.5 At both ends of sill flashing provide a separate piece of upturned flashing and seal against adjacent material. Vertical leg of upturn to be 38mm above horizontal line of sill flashing and have a horizontal leg of 38mm. Secure the upturned flashing in place.

3.2 Caulking

.1 Seal joints between frame members and other non-operating components with sealant to provide weathertight seal at outside and air vapour seal at inside.

.2 Apply sealant in accordance with manufacturer's recommendations. Conceal sealant within aluminum work except where exposed use is permitted by Departmental Representative. Provide foam backer rod in joint prior to caulking.

END OF SECTION

Part 1 GENERAL

1.1 Reference Standards

.1 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame manufacturer's Association.

1.2 Hardware List

.1 Submit hardware schedule for Departmental Representative’s approval.

.2 Indicate hardware proposed, including make, model, material, function, finish and other pertinent information.

1.3 Maintenance

.1 Provide maintenance data, parts lists, and manufacturer's instruction for each type door closers, locksets, door holders and fire exit hardware for incorporation into maintenance manual.

1.4 Maintenance Materials

.1 Supply two sets of wrenches for door passage and privacy sets.

1.5 Hardware Requirements

.1 Hardware standards listed in Paragraph 2.2 can be obtained through NRC standing offer program.

.2 NRC has a bonded locksmith for our keying system on standing contract. See contract coordinator for information.

.3 Contractor will be responsible to have all cylinders keyed by NRC bonded locksmith on standing offer contract.

.4 Contractor will be responsible to carry all associated costs for cylinders and keying of same with N.R.C. bonded standing offer locksmith.

Part 2 PRODUCTS

2.1 Hardware Items

.1 Only door latchsets listed below.

.2 Use one manufacturer's products only for all similar items.

2.2 Door Hardware Standards

.1 Hinges: Apply to all new doors.

.1 Interior doors: Dorex 114.3mm x 101.6mm x 179 454 NRP X C15.

.2 Latching devices: ANSI/BHMA Commercial Grade 1 hardware. Apply to all new doors

.1 Passage Set, "Yale" 4701(LN) F75, 'Augusta AU' lever, 626 finish

.2 Lockset "Yale"AU-5407-L 'Augusta AU' lever, 626 finish.

.3 Privacy Set "Yale" 4702(LN) F76A, 'Augusta AU' lever, 626 finish.

.3 Door-Weatherstrip and Door Bottom:

.1 Door bottom: K.N. Crowder CT-50, 626 finish, or approved equal.

.2 Weatherstrip: K.N. Crowder W-20N, 626 finish, or approved equal.

.3 Acoustic Door Astragal (on inactive leaf): Ambico Acoustic Door Astragal From STC 33 to STC52, surface mounted.

.4 Door Stops: Apply to all new doors.

.1 Half dome floor or wall mount door stop, solid brass dome, rubber bumper x 626.

.5 Door Threshold: Apply at ED012 and ED013

1. Threshold: K.N. Crowder CT-65, aluminium.

.6 Door Closer: "Norton" 1600BC-Reg x AL. Parallel arm with hold open function, maximum force applied to operate door 22N for barrier free compliance.

.7 Electric Strike: Von Duprin, VD 6223.DS FSE 24VDC 630

2.3 Fastenings

.1 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.2 Exposed fastening devices to match finish of hardware.

.3 Use fasteners compatible with material through which they pass.

Part 3 EXECUTION

3.1 Installation

.1 Furnish door and frame manufacturer with complete instructions and templates for preparation of their work to receive hardware.

.2 Furnish manufacturer's instructions for proper installation of each hardware component.

.3 Where door stop contacts door pulls, mount stop to strike bottom of pull.

.4 Weather-stripping shall not be installed until final coat of paint has been applied to door and frame and is completely dry.

.5 Only tradesmen competent in the installation of Finish Hardware shall be used for this purpose. The installer shall adjust, clean, and make good all installations of Finish Hardware to the satisfaction of the Departmental Representative.

3.2 SCHEDULE

.1 **Door D001** (45min Fire Rated)

.1	(3) Hinges		
.2	(1) Lock Set		
.3	(2) Kickplate	J102 250mm x 876-self adhesive	630
.4	(1) Floor stops		
.5	(1) Closer		

.2 **Door D002** (45 Min Fire Rated)

.1	(6) Hinges		
.2	(1) Passage Set		
.3	(4) Kickplate	J102 250mm x 876-self adhesive	630
.4	(2) Closer		
.5	(2) Flush Bolts, GSH401 x 12”		C26D
.6	(1) Dustproof Strike, GSH412		C26D
.7	(1) Astral KNC-W85 x 2135 MS CP (mount on pull side of active door)		
.8	Hold Open Hardware (re-install from removed doors)		

.3 **Door D003**

.1	(3) Hinges		
.2	(1) Lockset		
.3	(2) Kickplate	J102 250mm x 876-self adhesive	630
.4	(1) Floor stops		
.5	(1) Weatherstrip and Auto door bottom		

.4 **Door D004 & D007** (for each door listed below)

.1	(3) Hinges		
.2	(1) Passage Set		
.3	(2) Kickplate	J102 250mm x 876-self adhesive	630
.4	(1) Floor stops		
.5	(1) Weatherstrip and Auto door bottom		

.5 **Door D005**

.1	(6) Hinges		
.2	(1) Lock Set		
.3	(4) Kickplate	J102 250mm x 876-self adhesive	630
.4	(2) Weatherstrip and Auto door bottom		
.5	(1) Flush Bolts		
.6	(1) Acoustic door astragal.		

.6 **Door D006**

.1	(6) Hinges		
.2	(1) Lock Set		
.3	(4) Kickplate	J102 250mm x WTS-self adhesive	630
.4	(2) Closer		
.5	(1) Electric Strike		
.6	(1) Current Transfer VD EPT-10		SP28
.7	(2) Flush Bolts, GSH401 x 12”		C26D
.8	(1) Dustproof Strike, GSH412		C26D
.9	(2) Door Stops, GSH 209		C26D
.10	(1) Astral KNC-W85 x 2135 MS CP (mount on pull side of active door)		
.11	(1) Card Access from Corridor SG01 side (conduit and junction box infrastructure)		

.7 **Door D008** – Sliding Automatic Entrance.

.1 (1) Card Access from SG09 Loading Rm side of door.

.8 **Door D010**

.1	(6) Hinges		
.2	(1) Lock Set		
.3	(4) Kickplate	J102 250mm x WTS-self adhesive	630
.4	(2) Closer		
.5	(1) Electric Strike		
.6	(1) Current Transfer VD EPT-10		SP28
.7	(2) Flush Bolts, GSH401 x 12”		C26D
.8	(1) Dustproof Strike, GSH412		C26D
.9	(2) Door Stops, GSH 209		C26D
.10	(1) Astral KNC-W85 x 2135 MS CP (mount on pull side of active door)		
.11	(1) Card Access from Corridor SG01 side (conduit and junction box infrastructure)		

.9 **Door D011**

.1 (3) Hinges

.2 (1) Privacy Set

Legend:
GSH = Gallery Specialty Hardware
VD = Von Duprin
KNC = K.N. Crowder

END OF SECTION

Part 1 GENERAL

1.1 Samples

.1 Submit two 300 x 300 mm (1'-0" X 1'-0") samples of glass for approval by Designated Representative in accordance with Section 01 00 10.

Part 2 PRODUCTS

2.1 Glass Materials

.1 Tempered Glass: to CAN/CGSB-12.1, 6mm overall thickness unless indicated otherwise.

.2 Silvered mirror glass: 6mm thick tempered. 710mm x 1828mm, SS frame perimeter.

.3 Fire Rated Glass: glass ceramic, 5mm thick. Acceptable product “FireLite” or approved equal.

.4 Insulating Glass Units:

.1 Insulating glass units: to CAN/CGSB-12.8, double unit, 25 mm overall thickness.

.1 Glass thickness: 6 mm each light.

.2 Inter-cavity space thickness: low conductivity spacers 12mm between inner and outer lights.

.3 Glass coating: reflective low "E".

.4 Inert gas fill: argon.

.5 Glass privacy film: translucent, pressure sensitive adhesion, 3M or approved equal. To provide privacy at Bathroom and Fitting Rm glass units.

.6 Label: each light to be labelled, indicate name of manufacturer, thickness and quality of glass. Do not remove labels until final cleanup of project.

2.2 Glazing & Sealing Compound Materials

.1 Only compounds listed on the CGSB Qualified Products List are acceptable for use on this project.

.2 Sealing compound: two component, polysulphide, CANCGSB-19.24-M90, type 2, Class A, colour selected by Designated Representative.

.3 Glazing type: self shimming, preformed butyl tape, 10-15 durometer hardness, paper release.

.4 Setting blocks: neoprene, Shore "A" durometer hardness 75-85, 100 mm (4") long, of thickness suitable to glazing condition to provide adequate glazing bite.

.5 Glazing splines: manufacturer's standard dry glazing splines to suit aluminum extrusions.

.6 Primer-sealers and cleaners: to glass manufacturer's standard.

Part 3 EXECUTION

3.1 Workmanship

.1 Remove protective coatings and clean contact surfaces with solvent and wipe dry.

.2 Apply primer-sealer to contact surfaces.

.3 Place setting blocks in accordance with manufacturer's instructions.

.4 Install glass, rest on setting blocks, ensure full contact and adhesion at perimeter.

.5 Install removable stops, without displacing tape or sealant.

.6 Provide edge clearance of 3 mm (1/8") minimum.

.7 Apply cap bead of sealant at exterior void.

.8 Apply sealant to uniform and level line, flush with sightline and tooled or wiped with solvent to smooth appearance.

.9 Do not cut or abrade tempered, heat treated, or coated glass.

.10 Use manufacturer's standard glazing system in accordance with the following.

3.2 Interior Glazing

.1 Dry method - tape/tape:

.1 Cut glazing tape to length and install against permanent stop, project 1.5 mm (1/16") above sightline.

.2 Place glazing tape on free perimeter of glass in same manner described above.

.2 Combination method - tape/sealant:

.1 Cut glazing tape to proper length and install against permanent stop, projecting 1.5 mm (1/16") above sightline.

.2 Fill gap between glass and applied stop with sealant to depth equal to bite of frame on glass to uniform and level line.

.3 Trim off excess tape to sightline.

3.3 Finishing

.1 Immediately remove sealant and compound droppings from finished surfaces. Remove labels after work is completed and reviewed.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

.1 ASTM International

.1 ASTM C645-14, Standard Specification for Nonstructural Steel Framing Members.

.2 ASTM C754-15, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit drawings stamped and signed by professional Departmental Representative registered or licensed in the Province of Ontario, Canada

1.3 DESIGN REQUIREMENTS

.1 Design stud wall partition to withstand lateral loads imposed by sliding automatic door at Loading Area.

Part 2 PRODUCTS

2.1 Materials

.1 Non-loadbearing channel stud framing: to ASTM C645-83; 64mm (2-1/2”), 92mm (3-5/8"), 152mm (6”) stud sizes as indicated on drawings; roll formed from 0.53 mm (26 gauge) and 0.93mm (20 gauge), electro-galvanized steel sheet; for screw attachment of gypsum board. Knock-out service holes at 460 mm (1'-6") centres. Use heavier stud thickness (gauge) at partitions with impact resistant gypsum board.

.2 Floor and ceiling tracks: to ASTM C645-92b; in widths to suit stud sizes, 32 mm (1-1/4") flange height. Use heavier gauge track at partition with abuse resistant gypsum board.

.3 Ceiling brackets for attachment of partitions to underside of existing deck/beams above: Custom fabrication, ‘L’ shaped, 90mm vertical flange height with 6mm wide vertical slots, horizontal flange width 90mm x 200mm wide, roll formed from 0.478 mm thick electro-galvanized steel sheet. Use heavier gauge metal at partitions with impact resistant gypsum board.

.4 Metal channel stiffener: 38 x 20mm (1-1/2" x 3/4") size, 1.52 mm (16 gauge) thick cold rolled steel, coated with rust inhibitive coating.

.5 Insulating strip: rubberized, moisture resistant 3 mm (1/8") thick cork strip, 12 mm (1/2") wide, with self sticking adhesive on one face, lengths as required.

.6 Deflection Track: in widths to suit stud top track, 64mm flange height with 6mm wide vertical slots, roll formed from 0.478 mm thick electro-galvanized steel sheet. Use heavier

gauge track at partitions with impact resistant gypsum board. Acceptable Product: Bailey Multi-Slot Track – MST 250 or approved equal.

Part 3 EXECUTION

3.1 Erection

.1 Align partition tracks at floor and deflection track at ceiling and secure at 600 mm (2'-0") oc maximum.

.2 Install ceiling brackets at 600mm spacing and secure to underside of deck/beams prior to installation of sprayed on fire proofing. Protect vertical legs of bracket from fire proofing overspray.

.3 Place studs vertically at spacing indicated and not more than 50 mm (2") from abutting walls and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.4 Erect metal studding to tolerance of 1:1000.

.5 Attach studs to bottom using screws.

.6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.

.7 Co-ordinate erection of studs with installation of door frames and special supports or anchorage for work specified in other Sections.

.8 Provide wood blocking secured between studs for attachment of all bathroom accessories, and other fixtures including grab bars and towel rails, shelves, etc, attached to steel stud partitions.

.9 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, using column clips or other approved means of fastening placed alongside frame anchor clips.

.10 Erect track at head of door openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.

.11 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.12 Extend partitions to ceiling height except where noted otherwise on drawings.

.11 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

END OF SECTION

Part 1 GENERAL

1.1 Reference Standards

.1 Installation: to ASTM C636-92 except where specified otherwise.

1.2 Design Criteria

.1 Maximum deflection: 1/360th of span to ASTM C635-83 deflection test.

.2 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.3 Section Includes

.1 Provision of all labour, materials, equipment and incidental services necessary to provide acoustic tile ceiling systems including:

.1 Acoustic ceiling tiles
.2 Suspension grid systems
.3 Hangers and inserts
.4 Accessories for system

1.4 Samples

.1 Submit one representative sample of ceiling tile.

1.5 Closeout Submittals

.1 Provide ten (10) ceiling tiles for each pattern and type on project. Extra materials shall be from same production run as installed materials, in unopened packages.

Part 2 PRODUCTS

2.1 Materials

.1 Intermediate duty suspension system to ASTM C635-91.

.2 Basic materials for suspension system: commercial quality cold rolled steel, conforming to ASTM A525-91b and ASTM A526/A526M-90, zinc coated to Z275.

.3 Suspension system: non fire rated, made up as follows:

.1 Two directional exposed tee bar grid.

.4 Exposed tee bar grid components: shop painted satin sheen white. Components die cut. Main tee with double web, rectangular bulb and 25 mm (1") rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs: lower flange extended and offset to provide flush intersection.

.5 Hanger wire: galvanized soft annealed steel 3.0 mm (1/8") dia. (12 gauge).

.6 Hangers: self-drilling type anchors similar to Phillips "Red Head" T-32.

.7 Carrying channels: 38 x 25 mm (1-1/2" x 1") channel, of 1.2 mm thick galvanized steel.

.8 Ceiling tiles: to CAN/CGSB-92.1; 16mm (5/8”) thick non-combustible mineral fibre lay-in panels, square edge, colour white, Armstrong Cortega 769a White;

.1 ACT -1, 610mm x 1220mm (2’-0” x 4’-0”)

.2 ACT-2, 610mm x 610mm (2’-0” x 2’-0”)

.9 Accessories: splices, clips, wire ties, retainers and wall moulding, flush, to complement suspension system components, as recommended by system manufacturer.

Part 3 EXECUTION

3.1 Installation

.1 Install suspension system to manufacturer's instruction.

.2 Secure hangers to overhead structure using attachment methods acceptable to engineer. Install hangers spaced at maximum 1200 mm (4'-0") centres and within 150 mm (6") from ends of main tees.

.3 Do not erect ceiling suspension system until work above ceiling has been inspected by Designated Representative.

.4 Lay out system according to reflected ceiling plan.

.5 Suspension system and ceiling components to be installed continuous over walls of demountable office partitions. Coordinate installation to allow for installation of acoustic insulation over demountable wall locations.

.6 Ensure suspension system is co-ordinated with location of related components.

.7 Install wall mould to provide correct ceiling height. Finished ceiling system to be level within 1:1000.

.8 Completed suspension system to support superimposed loads, such as lighting fixtures, diffusers and grilles, etc.

.9 Support light fixtures, diffusers, with additional ceiling suspension hangers within 150 mm (6") of each corner and at 600 mm (2'-0") around perimeter of fixture, also install at splices.

.10 Interlock cross member to main runner to provide rigid assembly.

.11 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.

.12 Install ceiling tiles in correct seated position within suspended grid system.

3.2 Coordination

.1 Coordinate ceiling work to accommodate components of other sections, including light fixtures, diffusers, speakers, sprinkler heads, exposed mechanical and electrical installations, to be built into or above acoustical ceiling components.

3.3 Cleaning

.1 Touch up scratches, abrasions, voids and other defects in painted surfaces to the satisfaction of the Departmental Representative.

END OF SECTION

Part 1 GENERAL

1.1 Reference Standards

.1 Do work in accordance with CAN/CSA-A82.31-M91 except where specified otherwise.

Part 2 PRODUCTS

2.1 Gypsum Board

.1 Regular board: to CAN/CSA A82.27-M91 12.5mm (1/2") x 1200 mm (4'-0") wide x maximum practical length, edges tapered with round edge.

.2 Fire Rated board: Type X, 16mm (5/8") x 1200 mm (4'-0") wide x maximum practical length, edges tapered with round edge.

.3 Impact Resistant Gypsum Board: 16mm (5/8”) x 1200 mm (4'-0") wide x maximum practical length, edges tapered with round edge. Acceptable product: “Dens Armor Plus” by Georgia-Pacific or equal.

.4 Shaft Wall: 1 hr Fire Rated, ULC W452, 102mm C-H Stud, Deflection -L/240

2.2 Metal Furring

.1 Metal furring, runners, hangers, clips, tie wires & suspension to CSA A82.30-M1980, galvanized systems.

.2 Hangers: self-drilling type anchors similar to Phillips "Red Head" T-32.

.3 Drywall furring channels: 0.5 mm (0.02") core thickness galvanized steel channels for screw attachment of gypsum board.

2.3 Fastenings and Adhesives

.1 Nails, screws and staples: CAN/CSA- A82.31-M91.

.2 Laminating compound: to CAN/CSA-A82.31-M91, asbestos-free.

.3 Stud adhesive: to CAN/CGSB-71.25.

2.4 Accessories

.1 Casing beads, corner beads: 0.5 mm (0.02") base thickness commercial grade sheet steel with Z275 zinc finish to ASTM A525-91b, perforated flanges; one piece length per location.

.2 Acoustic sealant: to CAN/CGSB-19.21-M87.

.3 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Panel for joint sealants.

.4 Insulating strip: rubberized, moisture resistant, 3 mm (1/8") thick closed cell neoprene strip, 12 mm (1/2") wide, with self sticking permanent adhesive on one face; lengths as required.

.5 Joint compound: to CAN/CSA-A82.31-M91, asbestos-free.

.6 Access doors: Non-rated access doors for existing equipment installations, 16 ga door, 18 ga mounting frame, door flush to frame, rounded safety corners, continuous concealed hinge, screwdriver operated cam latch, paintable steel

Part 3 EXECUTION

3.1 Wall Furring

.1 Install wall furring for gypsum board wall finishes in accordance with CAN/CSA-A82.31-M91, except where specified otherwise.

.2 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.3 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.2 Gypsum Board Application

.1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical work are approved.

.2 Apply single layer gypsum board as indicated to metal furring or framing using screw fasteners. Maximum spacing of screws 300 mm (1'-0") oc.

.3 Arrange square edge gypsum board symmetrical about openings and wall areas, with butt joints, battens over joints. Utilize concealed installation clips to support boards in field of gypsum board panels and secure panels to back up components with screws that will not be exposed to view when installation is complete.

3.3 Sound Attenuation Blanket

.1 Sound insulation as noted under Section 07 20 00 Insulation.

3.4 Control Joints

.1 N/A.

3.5 Access Doors

.1 Install access doors to electrical and mechanical fixtures specified in respective Sections.

.2 Rigidly secure frames to furring or framing systems.

3.6 Taping and Filling

.1 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

.2 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

.3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after painting is completed.

.4 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.5 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for painting.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM F1066-04, Standard Specification for Vinyl Composition Floor Tile.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit duplicate 305 x 305mm sample pieces of each type of tile flooring.

1.3 AMBIENT CONDITIONS

.1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees for 48 hours before, during and 48 hours after installation.

1.4 MAINTENANCE

.1 Extra Materials:

.1 Provide extra materials of resilient tile flooring and adhesives.

.2 Provide 2 m^2 of each colour, pattern and type flooring material required for project for maintenance use.

.3 Extra materials one piece and from same production run as installed materials.

.4 Store where directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Vinyl tile:

.1 Type 1: Vinyl Composition Tile, 3.2mm thickness, Armstrong ‘Excelon-Raffia’ tile or approved equal, Colour’ 55800 Snowdrift’

.2 Sub-floor filler and leveller: 2 part latex-type filler requiring no water as recommended by flooring manufacturer for use with their product.

.3 Vinyl edge strips:

.1 Shoulder flush with top of adjacent floor finish.

.4 Sealer and wax: type recommended by tile flooring material manufacturer for material type and location and static dissipative performance.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 SITE VERIFICATION OF CONDITIONS

.1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

.2 Fill existing 25-32mm diameter holes that remain at existing concrete floor slab from removal of electrical monuments with concrete and patch over in preparation of new flooring. Approximately 50 existing holes to be filled.

3.3 PREPARATION

.1 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.

.2 Remove existing paint/epoxy floor finish, prepare floor to receive new tile finish.

.3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.5 Prime concrete slab to tile flooring manufacturer's printed instructions.

3.4 APPLICATION: FLOORING

.1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.

.2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.3 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.

.4 Cut flooring around fixed objects.

.5 Continue flooring over areas which will be under built-in furniture.

.6 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.7 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

.8 Install vinyl edge strips at unprotected or exposed edges where flooring terminates.

.9 Install copper grounding strips per floor manufacturers printed instructions and connect to grounding bar.

END OF SECTION

Part 1 GENERAL

1.1 General Requirements

.1 Section includes provision of all labour, materials, equipment and incidental services necessary to provide resilient base and transitions.

Part 2 PRODUCTS

2.1 Product Data

.1 Submit product data for base, adhesive and transitions.

.2 Submit WHMIS MSDS for all materials to be utilized or installed on site.

2.2 Resilient Base

.1 Base for flooring: vinyl, to ASTM F1861 Type TV, Group I (solid), 4 3/8" high, Johnsonite Tightlock Resilient Wall Base, in continuous lengths of minimum 75 ft.; colour; 121 Cement.

2.3 Accessories

.1 Transition Strips and Reducers: Vinyl to profile to suit conditions on site, colour 121 Cement.

.2 Adhesive:

.1 Wall base: water-based, solvent-free, acrylic adhesive, equivalent to Johnsonite #960 Wall Base Adhesive.

.2 Accessories: two-part, solvent-free, polyurethane adhesive, equivalent to Johnsonite #975 Two-Part Adhesive.

Part 3 EXECUTION

3.1 Demolition

.1 Remove dust, existing adhesive, dirt, sealer and wax from existing surfaces.

3.2 Examination

.1 Examine substrates for defects and determine level of preparation required prior to commencement of installation.

3.3 Installation

.1 Supply and install wall base to minimize joints. Use minimum length materials specified, call to wall lengths..

.2 Adhesive must cover 90% of back of base or accessories. Set base in adhesive tightly by using hand roller.

.3 Install base straight and level to a variation of 1:1000. Scribe and fit to door frames and other obstructions. Install base to all new millwork.

.4 Use material from same dye lot.

.5 Install transition strips at exposed carpet edges and centre under doors in door openings.

3.4 Protection of Finished Work

.1 Clean base immediately after completion of installation. Prohibit traffic near base until adhesive is cured.

END OF SECTION

Part 1 GENERAL

1.1 Related Sections

.1 Section 09 65 30 – Resilient Base and Accessories

1.2 General Requirements

.1 Section includes provision of all labour, materials, equipment and incidental services necessary to provide carpet floor finish, including primers, mortar, mastics and leveling fillers, adhesives, carpet material, accessories, and protection.

1.3 Action and Information Submittals

.1 Submit product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for each carpet tile, adhesive, subfloor patching compound and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Submit 2 copies of WHMIS MSDS.

.2 Submit Shop Drawings:

- .1 Information on shop drawings to indicate:
  - .1 Nap: direction, open edges, special patterns.
  - .2 Cutouts: show locations where cutouts are required.
  - .3 Edgings: show location of edge moldings and edge bindings.

.3 Samples:

- .1 Submit for review and acceptance of each unit.
- .2 Samples will be returned for inclusion into work.
- .3 Submit duplicate samples of each type of carpet tile specified and duplicate tiles for each colour selected.

.4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.5 Manufacturer's Instructions: submit manufacturer's installation and storage instructions.

.6 Manufacturers Reports:

- .1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance with specifications.

.7 Sustainable Design Submittals:

- .1 Low-Emitting Materials:
  - .1 Submit listing of adhesives used in building, showing compliance with VOC and chemical component limits or restriction requirements.

.2 Submit listing of carpet , carpet backer and adhesive used in building, showing compliance with CRI Indoor Air Quality Test Program.

1.4 Maintenance Materials Submittals

.1 Extra stock materials: Deliver to Departmental Representative extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels.

.1 Quantity: provide minimum 5% of:

.1 Carpet tile and Adhesives.

Delivery, storage and protection : comply with Departmental Representatives requirements for delivery and storage of extra materials.

1.5 Quality Assurance

.1 Regulatory Requirements:

.1 Comply with Health Canada regulations under "Hazardous Products Act", Part II of Schedule 1, to CAN/CGSB-4.2 No. 27.6.

Part 2 PRODUCTS

2.1 Product Data

.1 Submit product data for carpet, adhesive, carpet protection, mortar and subfloor filler.

.2 Submit WHMIS MSDS for all materials to be utilized or installed on site.

.3 Submit one (1) sample of each type of carpet tile specified.

2.2 Carpet Tile

.1 Acceptable Manufacture: Shaw or approved equal.

Type C1: Shaw, pattern “Ignite”, colour – “Oxidize”

Type C2: Shaw, pattern “Hyper Green”, colour – “Glowing”

Type C3: Shaw, pattern “Colour Form”, colour – “Glowing”

Type C4: Shaw, pattern “Colour Form”, colour – “Hyper Blue”

Type C5: Shaw, pattern “Colour Form”, colour – “Puzzle”

2.3 Accessories

.1 Seaming tape: types recommended by carpet manufacturer for purpose intended.

.2 Adhesive: Non-release type: two-part polyurethane by carpet tile manufacturer. Low VOC content in accordance with CRI requirements.

.3 Carpet protection; non-staining heavy duty kraft paper, or cardboard.

.4 Sub-floor filler and patch: Portland cement based, premix latex requiring only water to produce paste: ‘Planipatch’ by Mapei or approved equal.

.5 Transition strips: vinyl, Johsonite Slim Line Transitions, CTA-XX-J or approved equal.

Part 3 EXECUTION

3.1 Demolition

.1 Remove dust, existing adhesive, dirt, sealer and wax from existing surfaces.

3.2 Examination

.1 Examine substrates for defects and determine level of preparation required prior to commencement of installation.

.2 Report any major defects such as cracks greater than 1/16" (1.5mm) in width, and variations in elevation greater than ¼" in 10 feet (6mm in 3m) in any direction or excessive moisture content in concrete slabs.

.3 Ensure concrete floors are dry by using test methods recommended by flooring manufacturer, and exhibit negative alkalinity, carbonization or dusting.

3.3 Preparation

.1 Prepare existing floor slab throughout project area for application of all floor covering systems and products. Remove ridges and bumps.

.2 Scarify existing floor finishes to accept subfloor filler/patch. Apply subfloor filler/patch to low areas to achieve floor level to a tolerance of 1:500. Allow to cure.

.3 Precondition carpeting following manufacturer's printed instructions.

3.4 Installation

.1 Install carpet using minimum number of pieces.

.2 Install in carpet pattern as detailed. Use Type C1 for carpet field and cut out for C2 to C5 carpet accent strips.

.3 Install carpeting after finishing work is completed to ceilings and perimeter walls, but prior to demountable partition installations. Carpet installation to be continuous under demountable partitions.

.4 Finish installation to present smooth wearing surface free from conspicuous seams, burring hand other faults. Lay tiles with butt seams.

.5 Use material from same dye lot. Ensure, pattern and texture match.

.6 Apply adhesive and install carpet tile in accordance with manufacturer's written instructions.

3.5 Protection of Finished Work

.1 Vacuum carpet areas clean immediately after completion of installation. Protect traffic areas for duration of construction with carpet protection. Prohibit traffic on carpet until adhesive is cured.

END OF SECTION

Part 1 GENERAL

1.1 Samples

.1 Deliver on the Departmental Representative's request for approval, samples of materials proposed for use in the work. Make up samples 100mm wide by 300mm long (4" x 1'-0"). Finished work shall be equal to approved samples.

1.2 Qualifications

.1 Work shall be carried out by skilled labour under the supervision of a responsible and experienced foreman.

.2 Equipment shall be clean and in optimum working condition.

1.3 Protection

.1 Provide protective barriers and signs to protect the work and the public from contact with paint not yet dry.

.2 Protect surfaces likely to attract dust and insects thus liable to mar the finished surface.

.3 Have hardware, electrical and mechanical fittings removed and replaced by appropriate trades, else protect the above and other adjacent work.

1.4 Reference Standards

.1 Do painting and finishing to CGSB 85-GP series standards and to material manufacturer's instructions, except where specified otherwise.

.2 Stucco and Brick: Comply with CGSB 85-GP-31M.

.3 Concrete Floors: Comply with CGSB 85-GP-32M.

.4 Ferrous Metal: Comply with CGSB 81-GP-10M, 11a, 12, 13 or 15 as applicable.

.5 Galvanized Steel: 85-GP-16M.

.6 Copper & Copper Alloys: 85-GP-20M.

.7 Interior Plaster and Wallboard: 85-GP-33M.

1.5 WARNING

.1 **DO NOT USE SPRAY EQUIPMENT:** Only paint brush and roller will be accepted on this project with exception for painting of Cementitious Fireproofing and Mechanical and Electrical equipment (electrical conduit not to receive paint).

1.6 MAINTENANCE

.1 Extra Materials:

.1 Deliver to extra materials from same production run as products installed.

.2 Quantity: provide one - four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

.3 Delivery, storage and protection: comply with Departmental Representative for delivery and storage of extra materials.

Part 2 PRODUCTS

2.1 Materials

.1 Paint Materials: to CGSB Standards listed in Finishing Formula.

.2 Paint materials for each coating formula to be product of a single manufacturer.

.1 Acceptable Paint: Sherwin Williams or approved equal.

2.2 Colours

.1 Submit proposed Colour Schedule to Departmental Representative for review.

.2 Colour schedule will be based upon selection of one base colour and five accent colours. No more than eight colours will be selected for entire project and no more than three colours will be selected in each area.

2.1 Gloss/Sheen Rating

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

2.2 Finishing Formula

.1 Apply number of coats of specified materials to designated surfaces as follows:

.2 Interior Finishes:

.1 Gypsum Board Walls & Exist perimeter metal heater covers, apply:

.1 one coat primer-sealer CAN/CGSB-1.119-M89.

.2 two finish coats latex, Gloss Level 3, Sherwin Williams Paints:

.2 Doors and Frames surfaces apply:

.1 One coat primer-sealer.

.2 Two finish coats latex, Gloss Level 5, Sherwin Williams Paints (Door Frames are dissimilar in colour to Door).

.3 Concrete Floors:

.1 One coat primer-sealer.

.2 Two finish coats latex floor enamel Gloss Level 5, Sherwin Williams Paints:

.4 Metal Railings:

.1 One coat primer-sealer.

.2 Two finish coats latex Gloss Level 5, Sherwin Williams Paints:

.5 Exposed Mechanical and Electrical Equipment (except electrical conduit, refer to electrical spec):

.1 One coat primer-sealer.

.2 Two finish coats latex Gloss Level 2, Sherwin Williams Paints:

.6 Exposed Cementitious Fireproofing:

.1 One coat primer-sealer.

.2 Two finish coats latex Gloss Level 2, Sherwin Williams Paints:

2.3 Gloss/Sheen ratings

.1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

Part 3 EXECUTION

3.1 Examination of Surfaces

.1 Examine the work to be finished to determine whether the surfaces are in proper condition to receive paint work.

3.2 Manufacture's Instructions

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

3.3 Preparation of Surfaces

.1 General:

.1 Patch defective shop prime coats. Ensure that surfaces to be painted are smooth, level, dry, free from dust and any matter liable to interfere with adhesion of paint, cause bleeding or staining.

.2 Set all nails and screws below surface and putty flush.

.2 Substrates: Whenever substrates required repairs not covered by this specification, suspend work on the affected portion and advise the Departmental Representative. Paint repairs at completion as part of the original work.

.3 Ferrous Metal: Remove dirt and grease with Benzene. Remove rust and defective paint down to bare metal and touch up with red lead. Paint ferrous metals immediately upon delivery on site.

.4 Metal:

.1 Unpainted: Clean down to good metal. Use appropriate metal filler to restore the original surface. Coat with CAN/CGSB-1.121-93.

.2 Painted: Clean paint by washing. Treat bare spots as above.

3.4 Application

.1 Remove all paint liable to show or bleed through new finish. Prime uncoated surfaces only.

.2 Apply two finish coats to all previously finished or primed work.

.3 Give the Departmental Representative due notice and ample opportunity to inspect each coat and do not proceed with any coat until the last preceding coat is approved. Each coat shall be a different tint, under white a light blue.

.4 Apply no finish nor paint to wet, frozen or rusty surfaces.

.5 Clean castings with wire brushes.

.6 Do not paint at temperatures under 10°C (50°F) or over 35°C (95°F) (lacquer not lower than 15°C (59°F)) nor on surfaces where condensation is likely to form.

.7 Give additional coats to work which is unsatisfactory to the Departmental Representative after the application of the specified number of coats without extra compensation. Touch up dead or dull spots.

.8 Brush paint wood and metal surfaces. Other surfaces may be roller painted. Do not use rollers on uneven surfaces.

.9 Mix materials thoroughly, apply evenly, in full coats and free from sags, runs, crawls and other defects. Cut in neatly where required.

.10 Let each coat dry perfectly and hard before a following coat is applied.

.11 Finish ledges and surfaces above sight lines; tops, bottoms and edges of doors to match faces.

.12 Even up stained woodwork in colour as required by the nature of the wood.

.13 Apply all ready-mixed paint, lacquer, varnish or other finishes without cutting or admixture of any kind.

.14 Colour filler, if required. Work well into grain of wood, and before it sets, wipe clean.

.15 Apply material in accordance with the directions and instruction of their manufacturers.

.16 Doors, windows: and other shop made items, shop prime. Seal and paint the bottoms and edges of all doors before hanging.

.17 Allow a minimum of 24 hours between coats for oil based paints and 8 hours between coats of water based paints.

.18 Spray application; (cementitious fireproofing, mechanical and electrical equipment (electrical conduit to remain unpainted)):

.1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

.3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.

.4 Brush out immediately all runs and sags.

.5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.

3.5 Mechanical/Electrical Equipment.

.1 Paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment at; Main Printing Space Rm SG08 and Loading Area Rm SG09 with colour and finish as selected by Departmental Representative. Cementitious fireproofing, mechanical and electrical equipment (electrical conduit to remain unpainted).

.2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.

.3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.

.4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.

.5 Do not paint over nameplates.

.6 Keep sprinkler heads free of paint.

.7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.

.8 Paint fire protection piping red.

.9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.

.10 Paint natural gas piping yellow.

.11 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

.12 Do not paint interior transformers and substation equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 08 52 00 – Aluminum Windows.

1.2 REFERENCES

.1 ASTM International

.1 ASTM D1784-11, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature and data sheets for horizontal louver blinds and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Shop Drawings:

.1 Indicate on drawings dimensions in relation to window jambs, operator details, head and sill anchorage details, hardware and accessories details.

.3 Samples:

.1 Submit duplicate samples of manufacturer's standard colours for selection by Departmental Representative.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Design roller blinds to following requirements:

.1 Allow wear susceptible parts to be replaceable by either user or manufacturer.

.2 Guarantee of at least five-years of available replacement parts following discontinue of products manufacture.

.3 Include instructions for replacing or repairing worn parts, including inventory numbers for parts and procedures for ordering replacement parts.

.4 Include stamps on major plastic components indicating composition code to facilitate recycling efforts.

2.2 MATERIALS AND FABRICATION

.1 Manual operated roller shades: Acceptable manufacture, Hunter Douglas "RB 500 Manual Roller Shades", 10% open and 0% open (blackout) or approved equal.

.2 Fabrics: Inherently anti-static, flame retardant, fade and stain resistant, light filtering & blackout fabrics.

.1 Fabric Composition: 100% Polyester, PVC Free, 72% recycled content.

.2 Acceptable roller shade material: Hunter Douglas "Apollo – 0% Openness factor and GreenScreen Evolve – 10% Openness factor.

.3 Colour selections by Departmental Representative.

.3 Control Systems: Clutch Operated, engineered heavy duty chain drive pulley operating system consisting of metal clutch housing and locking plug containing minimum 6 ribs and inserted at minimum of 2-1/4" into roller tube. Lift torque enhancement provided by Counter Balance System with integrated spring support module.

.4 Dual Roller Shades: Universal mount steel brackets with 2 separate solar and room darkening blackout roller shades operating independently of each other.

.5 Bottom Bar: Extruded aluminum weight in a Sealed Pocket Hem Bar, or RB Bottom Bar for fabrics that are not seamable. Bottom bar is for tracking adjustments and provides uniform look

.6 Mounting Hardware: Manufacturer's standard heavy duty bracket constructed of hardened 3mm thick steel to support full weight of shade with bracket & screw hole covers to provide uniform look. Integrated leveling device for enhanced level adjustment of overall shade. Locking mechanism on bracket adapter provides for a secure installation and removal of the shade.

.7 Fascia: L shape removable aluminum extrusion valance that attaches to brackets and conceals roller shade.

.8 Roller Shade Pocket: Extruded aluminum alloy U shape housing for recessed mounting in acoustical tile or drywall ceilings. 5.25" (or 9") in diameter with aluminum closure mount.

.9 Blockout System: Extruded aluminum side channel with concealed mounting brackets. Bottom bar with nylon wool pile to prevent light leakage.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates and surfaces to receive horizontal louvre blinds previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to horizontal louvre blinds installation.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Departmental Representative.

3.2 INSTALLATION

.1 Install blinds at new exterior windows, as indicated on plans and details.

.2 Include centre brackets where necessary to prevent deflection of headrail.

.3 Adjust to provide for operation without binding.

.4 Use non corrosive metal fasteners for installation, concealed in final assembly.

3.3 ADJUSTING

.1 Adjust roller shade components for correct function and operation in accordance with manufacturer's written instructions.

.2 Lubricate moving parts to operate smoothly and fit accurately.

3.4 CLEANING

.1 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.5 PROTECTION

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

.2 Repair damage to adjacent materials caused by roller shade installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI A208.1-09, Particleboard.

.2 American National Standards Institute (ANSI)/Business and International Furniture Manufacturers Association (BIFMA) International

.1 ANSI/BIFMA X5.1-11, American National Standard for Office Furnishings, General Purpose Office Chairs - Tests.

.2 ANSI/BIFMA X5.6-10, American National Standard for Office Furnishings - Panel Systems.

.3 BIFMACMD-1-09, BIFMA Chair Measuring Device.

.3 ASTM International

.1 ASTM C297/C297M-04(2010), Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-44.227-2008, Freestanding Office Desk Products and Components.

.2 CAN/CGSB-44.232-2008, Task Chairs for Office Work Environments.

.5 CSA International

.1 CSA C22.2 No.9.0-96(R2011), General Requirements for Luminaires.

.2 CAN/CSA-C22.2 No.203-M91(R2010), Modular Wiring Systems for Office Furniture.

.3 CAN/CSA-Z809-08, Sustainable Forest Management.

.6 Forest Stewardship Council (FSC)

.1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.

.7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Architectural Painting Specification Manual - [current edition].

.8 Underwriters' Laboratories Canada (ULC)

.1 CAN/ULC-S102-2010, Standard Method of Test for Surfaces Burning Characteristics of Building Materials and Assemblies.

.9 Underwriters' Laboratories (UL)

.1 UL 1286-2008(R2011), Standard for Office Furnishings.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for furniture and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit 2 copies of WHMIS MSDS.

1.3 PERFORMANCE REQUIREMENTS

.1 Sound Transmission Classification: Test in accordance with ASTM E 90 by an independent agency and classified in accordance with ASTM E 413.

.1 NRC .85 and STC 18.

.2 Structural Performance: Test in accordance with ASTM E 72.

.2 Partitions must be capable of withstanding a uniformly distributed load of 0.24 kPa (5 psf) applied perpendicular to the partition without exceeding deflection of 1/240 of the partition height.

.3 Panel shall conform to BIFMA ANSI/BIFMA X5.6-2003 Standard for Panel Systems requirements.

.4 Standard Panel Fabrics shall comply with NFPA 701, method 1, requirements or be tested in accordance with ASTM E 84 or UL 723, on entire assembled panel and have a flame spread rating not exceeding 25 and a smoke development rating not exceeding 450 (Class A Flammability Requirements).

.5 Panels must meet Greenguard indoor air quality requirements or ANSI/BIFMA X7.1 - 2007 indoor air quality requirements

.6 Systems Panels shall be Listed to UL 1286.

.7 Storage pedestals, files are compliant with ANSI/BIFMA X5.9-2004 (Storage Units) or X5.6-2003 (Panel Systems with overhead shelving and units).

.8 Freestanding elements shall conform to ANSI/BIFMA X5.5-2008 (Desks and Tables).

1.4 SUSTAINABILITY CRITERIA

.1 Total recycled content shall be greater than 50% combining both post-consumer and pre-consumer recycled content.

.2 All metal components shall be 100% recyclable.

.3 All materials shall be free of hexavalent chrome, CFC's, and PDBE's.

.4 Adhesives used shall be solvent free and free of any hazardous air pollutants.

.5 Metal parts shall be powder coated and finished with a durable VOC-free finish which is applied in a process that generates low levels of recyclable waste.

.6 Product shall be GREENGUARD Indoor Air Quality Certified as low emitting furniture meeting LEED requirements of IEQ 4.5 Low Emitting Furniture.

1.5 QUALITY ASSURANCE

.1 Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.

1.6 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: submit operation and maintenance data for furniture for incorporation into manual.

.2 Supply part numbers of furniture to allow for replacement of worn or damaged furniture parts.

.3 Supply instructions detailing procedures for repairing or replacing worn furniture parts.

1.7 DELIVERY, STORAGE AND HANDLING

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

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

1.8 WARRANTY

.1 Submit written assurance that replacement parts will be available for minimum of 5 years following discontinuation of product manufacture.

.2 Ensure warranties provide for repair rather than replacement.

Part 2 Products

2.1 SYSTEMS FURNITURE MANUFACTURERS

.1 Acceptable Manufacturer and Product: ‘Compose’ by Haworth Inc, or approved equal.

2.2 SYSTEMS FURNITURE PANEL REQUIREMENTS

.1 All panels shall have an overall thickness of 75mm (3").

.2 Panel surfaces must be capable of being replaced or reupholstered in the field.

.3 Fabric tiles shall have a thick steel frame to increase rigidity. Tiles shall be removable.

.4 Frames shall consist of four roll-formed cold rolled steel tubes welded together at the corners into a rectangular frame and finished using an e-coating process. Frames shall be load bearing.

.5 Panels shall be reinforced to accommodate cantilevered work surfaces, shelves and storage units.

.6 Panels shall have integrated slots in the vertical frame that allow components to be mounted in 25mm (1") increments.

.7 Panel shall have leveling glides with a minimum 64mm (2.5") height adjustment and carpet grippers.

.8 Retain below for Environmentally Sensitive Projects

.9 Green core fabric tiles

.10 Panels shall have the capability to stack up to 90" and be connect to one another via a bolted connection.

.11 Panel connectors must be universal for use in all 90 degree conditions (2-,3- and 4-way conditions shall be orderable as a single line item).

.12 Glass stacking frames must be able to span multiple frames up to 2450mm (96”).

.13 The panel base raceway thickness shall not exceed the thickness of the panel. Base raceway shall contain all concealed electrical components.

.14 Panels shall offer side independent surfaces that include monolithic and segmented in multiple material finishes.

.15 Tiles must be capable of being specified to the floor (in lieu of a raceway cover) on both sides of the panel. Tiles must be the same catalog number regardless of install location.

.16 Include all hardware as required to attach partition to adjacent construction.

2.3 SYSTEMS FURNITURE TILE CONSTRUCTION

.1 Fabric/tackable tiles: 0.90mm (20-gauge (0.036") welded steel frame, no-added formaldehyde molded fiber-pad insert, covered with specified fabric; steel attachment clips.

.2 Slat tiles: Extruded aluminum with powdercoat paint finish; steel attachment clips.

2.4 SYSTEMS FURNITURE WORKSURFACES REQUIREMENTS

.1 Select Width and Depth

.2 Worksurfaces shall be available in widths from 600mm to 3050mm in 75mm (24"-120" in 3") increments.

.3 Worksurfaces shall be available in depths 450mm, 600mm and 760mm (18", 24" and 30").

.4 Worksurfaces shall be a minimum 30mm (1 3/16" in) thickness.

.5 Select Edge Finish

.6 Worksurfaces shall be edged in ABS edge band or vinyl T-mold.

.7 Select Finish and Material

.8 Worksurfaces shall be offered in wood veneer or plastic laminate.

.9 Select core below for Environmentally Sensitive Projects

.10 Worksurfaces shall offer a sustainable core material consisting of 100% recycled wood fiber or 100% post-consumer recycled wood waste bonded with no-added urea formaldehyde resin.

.11 Select End Panel Finish

.12 Worksurfaces shall be predrilled to accept pedestals and/or cantilevers.

.13 Provide grommet openings for wireway management.

2.5 SYSTEMS FURNITURE WORKSURFACE CONSTRUCTION

.1 Thickness: 47.62mm (1.1875”).

.2 Standard core: Engineered composite made with 100% recycled and/or recovered wood fiber bonded with resin, minimum 20.5 Kg (45 lbs) density; underside finished with paper backing material; compliant with Greenguard and ANSI/BIFMA Standards for Low-Emitting Products.

2.6 SYSTEMS FURNITURE WORKSURFACE HEIGHT ADJUSTABILITY

.1 Height adjustable table: 900mm to 1295mm (35" to 51")

.2 Width adjustment Range: 1200mm to 2135mm (48" – 84")

2.7 SYSTEMS FURNITURE UTILITIES - COMMUNICATIONS REQUIREMENTS

.1 Communication pathways shall be available in the base of the panel. The pathways shall accommodate a minimum of 42 cables at the base; 6mm (0.25") diameter cable @ 40% fill (in powered panels).

.2 Panel shall provide capability to route communication cabling both vertically and horizontally within the panel.

.3 Routed cables shall be accessed from either side of the panel base raceway.

.4 Horizontal cable management from panel to panel at desk height and base.

.5 Vertical cable manager for managing cables on the panel surface.

2.8 SYSTEMS FURNITURE UTILITIES - POWER REQUIREMENTS

.1 All electrical components shall be UL 1286 and/or 183 & CSA listed and meet the applicable requirements of the National Electrical Code/ Canadian Electrical Code.

.2 All panels shall be shipped with a raceway capable of distribution of 3- or 4-circuit, 20 amp (15 amp Canada) circuits.

.3 Power pole widths shall be equal to the thickness of the panels and the pole finish shall match the finish of the panel trim.

.4 Power pole shall be capable of being opened along the length of the vertical of the pole to permit lay-in of wiring.

.5 Panel base raceway covers shall have factory installed knockouts (4 per panel, 2 each side).

.6 External base in feed modules shall be capable of mounting into every base receptacle outlet location.

.7 The modular electrical system should be available with 100% PVC-free components.

2.9 SYSTEMS FURNITURE UPPER STORAGE SHELF AND OVERHEAD STORAGE UNITS (OSU)

.1 Shelves shall have a depth of 335mm (13¼") and shelf ends shall have a height of 200mm (8").

.2 Shelf and OSU shall be installed on equivalent width of one or more panels.

.3 The shelf shall have powder paint finish.

2.10 MEETING ROOM CHAIRS

.1 Acceptable Manufacturer and Product: 'Very Conference Chair' by Haworth Inc, or approved equal.

.1 Frame: 22 mm solid steel frame, constructed for strength and durability.

.2 Seat: High strength polymer with upholstered 25.4 mm (1") foam pad.

. 1 Polymer color: to Departmental Representatives selection from the standard range.

. 2 Upholstery: Grade B

.3 Back: High strength polymer with perforations

. 1 Polymer color: to Departmental Representatives selection from the standard range.

.4 Recline Mechanism: Weight assisted recline mechanism.

.5 Casters: Hard casters, black .

.6 Frame finish: polished aluminum

.7 Chair Style: Arm

.8 Arms: Provide arms with fog glass-filled polypropylene arm caps.

.9 Base: Trivalent Chrome

10. Dimensions:

.1 Seat Height: 521 mm (20.5")

. 2 Height: 937 mm (36.9")

. 3 Depth: 678 mm (26.7")

. 4 Width With Arms: 554 mm (21.8")

. 5 Seat Width: 479 mm (18.8")

. 6 Seat Depth: 438 mm (17.3")

. 7 Arm Height: 220 mm (8.7")

. 8 Distance between Arms: 528 mm (20.8")

2.11 LUNCH ROOM CHAIRS

.1 Acceptable Manufacturer and Product: 'Very Wire Stacker' by Haworth Inc, or approved equal.

.1 Frame: 11 mm solid steel frame, constructed for strength and durability.

.2 Seat and Back: High strength polymer shell.

. 1 Polymer color: to Departmental Representatives selection from the standard range.

.3 Glides: High impact clear nylon guides without ganging option

.4 Frame finish: Trivalent Chrome

.5 Chair Style: Armless

.6 Arms: Provide arms with fog glass-filled polypropylene arm caps.

.7 Base: Trivalent Chrome

.8 Stacking: All polymer chairs stack 10-high on the floor and 40 high on a cart.

.9 Dimensions:

.1 Seat Height: 440 mm (17.3")

. 2 Height: 778 mm (30.6")

. 3 Depth: 591 mm (23.3")

. 4 Width Without Arms: 554 mm (21.8")

. 5 Seat Width: 479 mm (18.8")

. 6 Seat Depth: 438 mm (17.3")

2.12 LUNCH ROOM TABLES

.1 Acceptable Manufacturer and Product: 'Planes X-Base' by Haworth Inc, or approved equal.

.1 Table Top Thickness; 30mm (1-3/16")

.2 Table edge: 3mm edgeband or knife edge

.3 Table Shape: 900mm (36") diameter-round x 760mm (29") high.

.4 Table Base: X-Base, Glides

.5 Colour: Standard Finish

2.13 MEETING ROOM TABLES

.1 Acceptable Manufacturer and Product: Krug – 'Nuvo'

.1 1830mm diameter x 10mm thick tempered glass

.2 Two Piece back painted glass.

.3 760 x 760 mm square base, full height with ballast, 'white' – plastic laminate finish.

Part 3 Execution

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

.1 Submittals: in accordance with Section 00 10 00 – General Instructions.

.2 Shop drawings to show:

- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.3 Shop drawings and product data accompanied by:

- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify current model production.
- .5 Certification of compliance to applicable codes.

.4 Closeout Submittals:

- .1 Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.
- .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data to include:
  - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
  - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
  - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  - .2 Equipment performance verification test results.
  - .3 Special performance data as specified.
  - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.
- .6 Approvals:

.1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.

.2 Make changes as required and re-submit as directed by Departmental Representative.

.7 Additional data:

.1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.

.8 Site records:

.1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.

.2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.

.3 Use different colour waterproof ink for each service.

.4 Make available for reference purposes and inspection.

.9 As-built drawings:

.1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.

.2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).

.3 Submit to Departmental Representative for approval and make corrections as directed.

.4 Perform testing, adjusting and balancing for HVAC using as-built drawings.

.5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.2 DEFINITIONS

.1 For purposes of this the Mechanical Division the following:

.1 "Concealed" - mechanical services and equipment in suspended ceilings and in chases and furred spaces.

.2 "Exposed" - will mean not concealed as defined above.

1.3 EXAMINATION OF THE SITE

.1 Carefully examine conditions at the site which the site will or may affect your work, and become familiar with both the new and existing construction, finishes, and other work associated with your work in order that your tender price includes for everything necessary for completion of your work within the proposed project schedule

1.4 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 00 10 00 – General Instructions.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 10 00 – General Instructions and 00 15 45 – General Safety Section and Fire Instructions.

1.5 MAINTENANCE

.1 Furnish spare parts in accordance with Section 00 10 00 – General Instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions and Section 00 15 45 – General Safety Section and Fire Instructions.

1.7 COORDINATION & COOPERATION WITH OTHER TRADES

.1 Co-ordinate your work with the work of all trades to ensure a proper and complete installation. Notify all trades concerned of the requirement for openings, sleeves, inserts and other hardware necessary in their work for the installation of your work.

.2 The exact locations and routing of mechanical and electrical services must be properly planned, coordinated and established with all affected trades prior to installation such that they will clear each other as well as any obstructions. Generally, piping requiring uniform pitch shall be given the right of way, with other services located and arranged to suit.

1.8 PERMITS, CERTIFICATES & FEES

.1 Display all required permits on worksite and include copies of inspection certificates in operating and maintenance instruction manuals.

.2 Obtain "Hot Work Permit" from the Engineer prior to commencement of soldering, welding or other high temperature work.

.3 Comply with all requirements of Section 001000.

1.9 FEDERAL HALOCARBON REGULATION

.1 Generate halocarbon records for work on equipment (cooling equipment with CFC's, HCFC's and HFC refrigerants; fire suppression systems; solvent cleaning systems)that may result in the release of a halocarbon.

.2 Tag equipment with duplicate of halocarbon record.

.3 Provide additional copy of halocarbon record to NRC for inclusion in the Zone Halocarbon Service File.

1.10 CLEANING & FINAL ADJUSTMENT

.1 During construction, keep the site reasonably clear of rubbish and waste material resulting from your work on a daily basis to the satisfaction of the Engineer. Notify the general contractor of any requirements for a waste receptacle for disposal of waste materials.

.2 Clean interior and exterior of all systems including strainers, and vacuum interior of air handling units.

.3 Clean and refurbish all equipment and leave in first class operating condition including replacement of all filters in all air and piping systems.

.4 Balance and adjust all systems and each piece of equipment to operate as designed.

1.11 PROTECTION OF EQUIPMENT & MATERIALS

.1 Properly protect all of your equipment and materials on site from damage due to the elements, your work and the work of other trades, to the approval of the Engineer.

.2 Wherever possible, coordinate equipment deliveries with the manufacturers and/or suppliers such that equipment is delivered to the site when it is required, or so that it can be suitably stored within the building and protected from the elements.

1.12 STORAGE OF EQUIPMENT & MATERIALS

.1 Arrange for sufficient storage facilities off the premises for the storage of equipment and materials which will not be allowed to stand in the open, nor to interfere with normal operations in the building.

.2 Bring prefabricated materials on the job site as and when required to be installed.

1.13 HOISTING & SCAFFOLDING

.1 Provide all necessary hoists and scaffolds required for your work.

.2 Design and construction of scaffolding to be in accordance with CSA S269.2

.3

Part 2 Products

2.1 MATERIALS

.1 Materials and products in accordance with Section 00 10 00 – General Instructions.

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

.1 Do painting in accordance with Section 09 91 23 - Interior Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged.

3.2 CLEANING

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

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 00 10 00 – General Instructions and submit report as described in PART 1 - SUBMITTALS.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 DEMONSTRATION (If Required)

.1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

.2 Trial usage to apply to following equipment and systems:

.1 Fume hood and associated services.

.3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.5 Instruction duration time requirements as specified in appropriate sections.

.6 Determination of whether or not demonstration is required will be decided by Departmental Representative in consultation with end user (client).

3.5 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED

.1 Section 00 10 00 – General Instructions
.2 Section 00 15 45 – General Safety Section and Fire Instructions
.3 Section 21 05 01 – Common Work Results- Mechanical

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB).
  .1 CAN/CGSB-1.60-[M89], Interior Alkyd Gloss Enamel.
  .2 CAN/CGSB-24.3-[92], Identification of Piping Systems.
.2 Canadian Gas Association (CGA).
  .1 CAN/CGA B149.1-[M95].
  .2 CAN/CGA B149.2-[M91].

.3 National Fire Protection Association
  .1 NFPA 13-1989, Installation of Sprinkler Systems.
  .2 NFPA 14-1986, Standpipe and Systems.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 00 10 00 – General Instructions.
.3 Product data to include paint colour chips, all other products specified in this section.

1.4 SAMPLES

.1 Submit samples in accordance with Section 00 10 00 – General Instructions.
.2 Samples to include nameplates, labels, tags, lists of proposed legends.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

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

2.2 EXISTING IDENTIFICATION SYSTEMS

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

2.3 PIPING SYSTEMS GOVERNED BY CODES

.1 Identification:
  .1 Natural gas: To [CAN/CGA B149.1]
  .3 Sprinklers: To NFPA 13.

.4 Standpipe and hose systems: To NFPA 14.

2.4 IDENTIFICATION OF PIPING SYSTEMS

.1 Identify contents by background colour, marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.

.2 Pictograms:

.1 Where required, to Workplace Hazardous Materials Information System (WHMIS) regulations.

.3 Legend:

.1 Block capitals to sizes and colours listed in CAN/CGSB-24.3.

.4 Arrows showing direction of flow:

.1 Outside diameter of pipe or insulation less than 75 mm: 100 mm long x 50 mm high.

.2 Outside diameter of pipe or insulation 75 mm and greater: 150 mm long x 50 mm high.

.3 Use double-headed arrows where flow is reversible.

.5 Extent of background colour marking:

.1 To full circumference of pipe or insulation.

.2 Length to accommodate pictogram, full length of legend and arrows.

.6 Materials for background colour marking, legend, arrows:

.1 Pipes and tubing 20 mm and smaller: Waterproof and heat-resistant pressure sensitive plastic marker tags.

.2 All other pipes: Pressure sensitive [plastic-coated cloth] [vinyl] with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150øC and intermittent temperature of 200øC.

.7 Colours and Legends:

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

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

Background colour: Yellow Legend, arrows: BLACK
Green WHITE
Red WHITE

.3 Background colour marking and legends for piping systems:

Contents	Background Colour	Legend
Hot water heating supply	Yellow	HEATING SUPPLY
Hot water heating return	Yellow	HEATING RETURN
Domestic hot water supply	Green	DOM. HW SUPPLY
Dom. HWS recirculation	Green	DOM. HW CIRC
Domestic cold water supply	Green	DOM. CWS
Sanitary	Green	SAN
Plumbing vent	Green	SAN. VENT
Compressed air (700 kPa)	Green	COMP. AIR 700 kPa

2.5 IDENTIFICATION DUCTWORK SYSTEMS

.1 50 mm high stencilled letters and directional arrows 150 mm long x 50 mm high.

.2 Colours: Black, or co-ordinated with base colour to ensure strong contrast.

.3 Ductwork Identification shall clearly indicated air supply types by the following labels:

- High Pressure Supply Air- HP SUPPLY
- Cold Air Supply- COLD SUPPLY
- Hot Air Supply- HOT SUPPLY

2.6 CONTROLS COMPONENTS IDENTIFICATION

.1 Identify all systems, equipment, components, controls, sensors with system nameplates as specified in section 25 05 54 – EMCS Identification.

2.7 LANGUAGE

.1 Identification to be in English.

PART 3 - EXECUTION

3.1 TIMING

.1 Provide identification only after all painting and jacketing has been completed.

3.2 INSTALLATION

.1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.

.2 Provide ULC and/ or CSA registration plates as required by respective agency.

3.3 NAMEPLATES

.1 Locations:

.1 In conspicuous location to facilitate easy reading and identification from operating floor.

.2 Standoffs:

.1 Provide for nameplates on hot and/or insulated surfaces.

.3 Protection

.1 Do not paint, insulate or cover in any way.

3.4 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

.1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels: At not more than 17 m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.

.2 Adjacent to each change in direction.

.3 At least once in each small room through which piping or ductwork passes.

.4 On both sides of visual obstruction or where run is difficult to follow.

.5 On both sides of separations such as walls, floors, partitions.

.6 Where system is installed in pipe chases, ceiling spaces, galleries, other confined spaces, at entry and exit points, and at each access opening.

.7 At beginning and end points of each run and at each piece of equipment in run.

.8 At point immediately upstream of major manually operated or automatically controlled valves, dampers, etc. Where this is not possible, place identification as close as possible, preferably on upstream side.

.9 Identification to be easily and accurately readable from usual operating areas and from access points.

.1 Position of identification to be approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.5 VALVES, CONTROLLERS

.1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed "S" hooks.

.2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by NRC representative. Provide one copy (reduced in size if required) in each operating and maintenance manual.

.3 Number valves in each system consecutively.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Thermal insulation for piping and piping accessories.

1.2 REFERENCES

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

.1 ASHRAE Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Manufacturer's Trade Associations

.1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).

1.3 DEFINITIONS

.1 For purposes of this section:

.1 "CONCEALED" - insulated mechanical services in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" - will mean "not concealed" as specified.

1.4 SUBMITTALS

.1 Submittals: in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet. Include product characteristics, performance criteria, and limitations.

.1 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

.3 Shop Drawings:

.1 Submit shop drawings in accordance with Section 00 10 00 – General Instructions.

.1 Shop drawings: submit drawings stamped for review by NRC.

.4 Samples:

.1 Samples: Not required.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.2 Installer: specialist in performing work of this Section, and have at least 3 years successful experience in this size and type of project, member of TIAC.

.3 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 00 10 00 – General Instructions.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.2 Storage and Protection:

.1 Protect from weather, theft, construction traffic.

.2 Protect against damage.

.3 Store at temperatures and conditions required by manufacturer.

.3 Waste Management and Disposal:

.1 Remove all material from NRC property and dispose, reuse and recycle excel material as per local good waste management practices.

.2 Place excess or unused insulation and insulation accessory materials in designated containers.

Part 2 Products

2.1 FIRE AND SMOKE RATING

.1 In accordance with CAN/ULC-S102.

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 TIAC Code A-3: rigid moulded mineral fibre with factory applied vapour retarder jacket.

.1 Vapor retarder jacket includes a continuous longitudinal self-sealing closure lap.

.2 Jacket shall be suitable to be painted with future latex paint.

.3 Mineral fibre: CAN/ULC S102-M88

.4 Jacket: to CGSB 51-GP-9M, self-sealing lap.

.5 Temperature Range: 0 to 538 °C

.6 Maximum "k" factor: 0.033 W/m°C at 24°C to ASTM C 335.

2.3 INSULATION SECUREMENT

.1 Tape: self-adhesive, aluminum 50 mm wide minimum.

.2 Contact adhesive: quick setting.

.3 Canvas adhesive: washable.

.4 Single/double bands: stainless steel, 19 mm wide, 0.5 mm thick.

.5 Wire mesh: 25 mm hexagonal type 304 stainless steel wire mesh, tightly laced together at horizontal and circumferential mesh joints.

2.4 VAPOUR RETARDER LAP ADHESIVE

.1 Water based, fire retardant type, compatible with insulation.

2.5 INDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

2.6 OUTDOOR VAPOUR RETARDER FINISH

.1 Vinyl emulsion type acrylic, compatible with insulation.

.2 Reinforcing fabric: fibrous glass, untreated 305 g/m^2.

2.7 JACKETS

.1 Polyvinyl Chloride (PVC):

.1 One-piece moulded type to CAN/CGSB-51.53 with pre-formed shapes as required.

.2 Colours: White

.3 Minimum service temperatures: -20 °C

.4 Maximum service temperature: 65 °C

.5 Moisture vapour transmission: 0.02 perm.

.6 Thickness: 0.3 mm.

.7 Fastenings:

.1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
.2 Pressure sensitive vinyl tape of matching colour.

.8 Special requirements:
.1 Indoor: As indicated.
.2 Outdoor: UV rated material at least 0.5 mm thick.

.2 Interior / Exterior acoustic lagging

.1 Barrier shall be constructed of a 3-mm thick mass loaded, limp vinyl sheet bonded to a thin layer of reinforced aluminum foil on one side. The barrier shall have a nominal density of 4.9-kg/m2 and shall have a minimum STC rating of 28. The barrier shall exhibit minimum flammability ratings of 0.0-seconds for flame-out and after-glow, and 5-mm for char length when tested in accordance with Federal Test Std. No. 191-5903. The barrier shall have a minimum thermal conductivity (K) value of 0.29 and a rated service temperature range of -40°C to 105°C. When tested for Surface Burning Characteristics per ASTM E84, the barrier will have a Flame Spread Index of no more than 10 and a Smoke Development Index of no more than 40.

.2 The decoupling layer shall be a combination of 25-mm fiber glass batting, non-woven porous scrim-coated glass cloth, quilted together in a matrix of 100-mm diamond stitch pattern which encapsulates the glass fibers.

.3 The composite material shall be fabricated to include a nominal 152-mm wide barrier overlap tab extending beyond the quilted fiber glass to facilitate a leak-tight seal around field joints. Nominal barrier width 1372-mm, nominal fiber glass batt decoupler width 1219-mm.

.4 Insertion Loss when tested to ASTM E1222-90:

Frequency, Hz	125	250	500	1000	2000	4000	STC
Loss	3	6	7	18	24	27	28

.5 Finish: stucco embossed

.6 Metal jacket banding and mechanical seals: stainless steel, 19 mm wide, 0.5 mm thick at 300 mm spacing.

.3 Prefabricated, Self-Adhering, Sheet-Type Waterproofing Membrane:

.1 Description: Top Layer: Stucco-embossed, UV-resistant aluminum weathering surface. Middle Layer: Double layer of high-density polyethylene reinforcement. Bottom Layer: Uniform layer of rubberized asphalt adhesive, protected by disposable silicone release paper.

.2 Color: Aluminum

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PRE-INSTALLATION REQUIREMENT

.1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified by NRC.

.2 Piping to be inspected and approved by NRC.

.3 Surfaces clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturers instructions and this specification.

.3 Use two layers with staggered joints (minimal 400 mm) when required nominal wall thickness exceeds 50 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Install hangers, supports outside vapour retarder jacket.

.5 Supports, Hangers:

.1 Apply high temperature and compressive strength insulation between all hangers and piping where temperature of pipe exceeds 230 °C. Insulation to be sized to suit compressive loads at hanger. Where pipe surface temperature is less then 230°C, wood blocking may be used between pipe support hanger.

3.4 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

.1 Application: at expansion joints, valves, primary flow measuring elements, flanges, unions, equipment and where indicated.

.2 Design: to permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.

.3 Insulation:

.1 Insulation, fastenings and finishes: same as system.

.2 Jacket: PVC

3.5 INSTALLATION OF ELASTOMERIC INSULATION

.1 Insulation to remain dry. Overlaps to manufacturers instructions. Ensure tight joints.

.2 Provide vapour retarder as recommended by manufacturer.

3.6 PIPING INSULATION SCHEDULES

.1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.

.2 TIAC Code: A-3.

.1 Securements: SS bands at 300 mm on centre.

.2 Seals: VR lap seal adhesive, VR lagging adhesive.

.3 Installation: TIAC Code: 1501-C.

.3 Thickness of insulation as listed in following table.

.1 Run-outs to individual units and equipment not exceeding 4000 mm long.

.2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	MAX TEMP. °C	TIAC CODE	Pipe sizes (NPS) and insulation thickness (mm)				
			< 1	1 to <1-1/2	1-1/2 to < 4	4 to < 8	8 & over
Heating Water/Glycol	100	A-3	25	25	25	38	38
Domestic hot water		A-3	25	25	25	25	25
Domestic cold water		A-3	25	25	25	25	25

.4 Finishes:

.1 Exposed indoors: PVC jacket- Colour White

.2 Installation: to appropriate TIAC code CRF/1 through CPF/5.

3.7 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Selection of piping valves in domestic water system.

1.2 RELATED SECTIONS

.1 Section 00 10 00 – General Instructions

.2 Section 00 15 45- General Safety Section and Fire Instruction

.3 Section 23 05 23.01 Valves – Bronze.

.4 Section 23 05 23.05 Butterfly Valves

.5 Section 23 05 01 - Installation of Pipework

1.3 REFERENCES

.1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME)

.1 ANSI/ASME B16.15, Cast Bronze Threaded Fittings, Classes 125 and 250.

.2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

.3 ANSI/ASME B16.22, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

.4 ANSI/ASME B16.24, Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500 and 2500.

.2 American National Standards Institute/American Water Works Association (ANSI)/(AWWA)

.1 ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

.3 Canadian Standards Association (CSA International)

.1 CSA B242, Groove and Shoulder Type Mechanical Pipe Couplings.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.6 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS).

.1 MSS-SP-67, Butterfly Valves.

.2 MSS-SP-70, Gray Iron Gate Valves, Flanged and Threaded Ends.

.3 MSS-SP-71, Gray Iron Swing Check Valves, Flanged and Threaded Ends.

.4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.

.7 National Research Council (NRC)/Institute for Research in Construction

.1 NRCC 38728, National Plumbing Code of Canada (NPC) .

.8 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide manufacturer shop drawings for all valves, piping, fittings and as specified on drawings and in section 01000

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for insulation and adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 DELIVERY, STORAGE AND HANDLING

.1 See section 01000

Part 2 Products

2.1 PIPING

.1 Domestic hot, cold and recirculation systems, within building.

.1 Above ground: copper tube, hard drawn, type L: to ASTM B88M.

.2 Buried or embedded: copper tube, soft annealed, type K: to ASTM B88M. No buried joints.

2.2 FITTINGS

.1 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22. NPS 2 and larger: roll grooved to CSA B242.

.3 Cast bronze threaded fittings, Class 150: to ANSI/ASME B16.15.

.4 Cast copper, solder type: to ANSI/ASME B16.18.

.5 Bronze pipe flanges and flanged fittings, Class 150 to ANSI/ASME B16.24.

2.3 JOINTS

.1 Solder: 95% tin / 5% copper alloy.

.2 Teflon tape: for threaded joints.

.3 Dielectric connections between dissimilar metals: dielectric fitting, complete with thermoplastic liner.

2.4 GLOBE VALVES

.1 NPS 2 and under, screwed

.1 NPS 2 and under: screwed ends, OS&Y, class 150, see section 23 05 23 01 Valves – Bronze

.2 See Section 23 05 23.01 Valves – Bronze

2.5 SWING CHECK VALVES

.1 NPS 2 and under, soldered:

.1 To MSS-SP-80, Class 150, bronze body, bronze swing disc, screw in cap, see Section 23 05 23.01 - Valves – Bronze.

.2 NPS 2 and under, screwed:

.1 To MSS-SP-80, Class 150, bronze body, bronze swing disc, screw in cap, see Section 23 05 23.01 - Valves - Bronze.

.3 NPS 2-1/2 to NPS 24, flanged:

.1 To MSS-SP-71, Class 125, cast iron body, flat flange faces, see Section 23 05 23.02 - Valves - Cast Iron:

2.6 BALL VALVES

.1 NPS 2 and under, screwed:

.1 Threaded, 2-Piece, Std. Port, Bronze Ball Valve, 600 CWP, with extension, see Section 23 05 23.01 - Valves - Bronze

.2 NPS 2 and under, soldered:

.1 Solder, 2-Piece, Std. Port, Bronze Ball Valve, 600 CWP, with extension, see Section 23 05 23.01 - Valves - Bronze.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install in accordance with Ontario Plumbing Code.

.2 Install pipe work in accordance with Section 23 05 01 - Installation of Pipework, supplemented as specified herein.

.3 Assemble piping using fittings manufactured to ANSI standards.

.4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.

.5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.

.6 Buried tubing:

.1 Lay in well compacted washed sand in accordance with AWWA Class B bedding.

.2 Bend tubing without crimping or constriction. Minimize use of fittings.

.7 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance and equipment removal.

3.3 VALVES

.1 Isolate equipment with unions, fixtures and branches with gate valves.

.2 Provide valves as indicated on drawing and in specifications.

.3 Balance recirculation system using balancing valve. Mark settings and record on as-built drawings on completion.

.4 Provide line size check valve on discharge of all pumps.

3.4 PRESSURE TESTS

.1 Test pressure: Hydrostatic test pressure (1.5 times maximum working pressure), Pneumatic test pressure (1.2 maximum working pressure pending NRC approval) for a minimum of 15 minutes. All tests must be witnessed and approved by NRC.

.2 Provide NRC with a minimum of 48 hours notice in writing before all pressure tests.

3.5 FLUSHING AND CLEANING

.1 Flush entire system for 8 h. Ensure outlets flushed for 2 h. Let stand for 24 h, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean copper to Provincial potable water guidelines.

3.6 PRE-START-UP INSPECTIONS

.1 Systems to be complete, prior to flushing, testing and start-up.

.2 Verify that system can be completely drained.

.3 Ensure that pressure booster systems are operating properly.

.4 Ensure that air chambers, expansion compensators are installed properly.

3.7 START-UP

.1 Timing: Start up after:

.1 Pressure tests have been completed.

.2 Certificate of static completion has been issued.

.2 Provide continuous supervision during start-up.

.3 Start-up procedures:

.1 Establish circulation and ensure that air is eliminated.

.2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.

.3 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.

.4 Check control, limit, safety devices for normal and safe operation.

3.8 PERFORMANCE VERIFICATION

.1 Scheduling:

.1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.

.2 Procedures:

.1 Verify that flow rate and pressure meet Design Criteria.

.2 Adjust pressure regulating valves while withdrawal is maximum and inlet pressure is minimum.

.3 Sterilize HWS and HWC systems for Legionella control.

.4 Verify performance of temperature controls.

.5 Verify compliance with safety and health requirements.

.6 Check for proper operation of water hammer arrestors. Run [one][two…] outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.

.7 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

.3 Section 21 05 01 – Common Work Results – Mechanical

.4 Section 21 05 02 – Mechanical Identification

.5 Section 23 05 05 – Installation of Pipework

1.2 REFERENCES

.1 ASTM International Inc.

.1 ASTM B32-[08], Standard Specification for Solder Metal.

.2 ASTM B306-[02], Standard Specification for Copper Drainage Tube (DWV).

.3 ASTM C564-[03a], Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

.2 Canadian Standards Association (CSA International).

.1 CSA B67-[1972(R1996)], Lead Service Pipe, Waste Pipe, Traps, Bends and Accessories.

.2 CAN/CSA-B70-[06], Cast Iron Soil Pipe, Fittings and Means of Joining.

.3 CAN/CSA-B125.3-[05], Plumbing Fittings.

.3 Green Seal Environmental Standards (GSES)

.1 Standard GS-36-[00], Commercial Adhesives.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for adhesives, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions and 00 15 45 - General Safety Section and Fire Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 COPPER TUBE AND FITTINGS

.1 Above ground sanitary (less than 50mm (2" NPS)) and vent: Type DWV to: ASTM B306.

.1 Fittings.

.1 Cast brass: to CAN/CSA-B125.3.

.2 Wrought copper: to CAN/CSA-B125.3.

.2 Solder: lead free, tin-antimony 95:5, to ASTM B32.

2.2 CAST IRON PIPING AND FITTINGS

.1 Above ground sanitary (greater than 50mm (2" NPS)): to CAN/CSA-B70.

.1 Joints:

.1 Hub and spigot:

.1 Caulking lead: to CSA B67.

.2 Mechanical joints:

.1 Neoprene or butyl rubber compression gaskets with stainless steel clamps.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 In accordance with Section 23 05 05 – Installation of Pipework.

.2 Install in accordance with National Plumbing Code, supplemented as per Provincial Plumbing Code.

3.3 TESTING

.1 Pressure test buried systems before backfilling.

.2 Hydraulically test to verify grades and freedom from obstructions.

3.4 PERFORMANCE VERIFICATION

.1 Cleanouts:

.1 Ensure accessible and that access doors are correctly located.

.2 Open, cover with linseed oil and re-seal.

.3 Verify that cleanout rods can probe as far as the next cleanout, at least.

.2 Test to ensure traps are fully and permanently primed.

.3 Storm water drainage:

.1 Verify domes are secure.

.2 Ensure weirs are correctly sized and installed correctly.

.3 Verify provisions for movement of roof system.

.4 Ensure that fixtures are properly anchored, connected to system and effectively vented.

.5 Affix applicable label (storm, sanitary, vent, pump discharge etc.) c/w directional arrows every floor or 4.5 m (whichever is less).

3.5 LABELLING

.1 Label all above ground (sanitary), (storm), (vent) piping as per section 21 05 02 – Mechanical Identification. Labels provided by NRC representative, installed by contractor.

3.6 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for plumbing specialties and accessories.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM).

.1 ASTM A126, Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.

.2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.

.2 American Water Works Association (AWWA).

.1 AWWA C700, Cold Water Meters-Displacement Type, Bronze Main Case.

.2 AWWA C701, Cold Water Meters-Turbine Type for Customer Service.

.3 AWWA C702-1, Cold Water Meters-Compound Type.

.3 Canadian Standards Association (CSA International).

.1 CSA-B64 Series, Backflow Preventers and Vacuum Breakers.

.2 CSA-B79, Floor, Area and Shower Drains, and Cleanouts for Residential Construction.

.3 CSA-B356, Water Pressure Reducing Valves for Domestic Water Supply Systems.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.5 Plumbing and Drainage Institute (PDI).

.1 PDI-G101, Testing and Rating Procedure for Grease Interceptors with Appendix of Sizing and Installation Data.

.2 PDI-WH201, Water Hammer Arresters Standard.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.

.2 Indicate dimensions, construction details and materials for specified items.

.2 Shop Drawings:

.1 Submit shop drawings to indicate ,materials, finishes, method of anchorage, number of anchors, dimensions, color, construction and assembly details.

.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Instructions: submit manufacturer's installation instructions.

.5 Manufacturers' Field Reports: manufacturers' field reports specified.

Part 2 Products

2.1 CLEANOUTS

.1 Line cleanout: in cast iron pipe with bolted neoprene gasketed cover secured to body with brass bolts, with full size pipe opening. Access shall be made by round stainless steel plate and slotted flat head stainless steel screws.

2.2 WATER HAMMER ARRESTORS

.1 Stainless steel construction, piston type: Normal operating pressure 35 to 250 PSIG. Spike pressure 1,500 PSIG.

.2 Copper construction, piston type, working pressure, 150 psig from 33 to 180 deg F PDI-WH201

2.3 VACUUM BREAKERS

.1 Breakers: to CSA-B64 Series, vacuum breaker hose connection.

.2 Hose Connection Vacuum Breakers: chrome finish stainless steel working parts, a rubber diaphragm and disc, and a draining stem.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install in accordance with latest version of Ontario Building Code.

.2 Install in accordance with manufacturer's instructions and as specified.

3.3 ACCESS DOORS

.1 Supply access doors to give access to all valves, cleanouts, strainers, duct access doors, and other similar mechanical work which may need maintenance or repair but which is concealed in inaccessible construction, except as otherwise specified herein or on the drawings.

.2 Locate access doors in walls and partitions to the Engineer's approval, and arrange mechanical work to suit.

.3 Group piping and ductwork to ensure the minimum number of access doors is required. Access doors will be installed by the trades responsible for the particular type of construction in which the doors are required.

.4 Access doors shall be, wherever possible, of a standard size for all applications. Confirm exact dimensions prior to ordering.

3.4 CLEANOUTS

.1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required code, and as indicated.

.2 Bring cleanouts to wall or finished floor unless serviceable from below floor.

.3 Building drain cleanout and stack base cleanouts: line size to maximum NPS4.

3.5 STRAINERS

.1 Provide strainers in piping where shown on the drawings and where specified herein.

.2 Equip strainers 50mm (2") diameter and larger with valved blowdown piping.

.3 Terminate blowdown piping over the nearest funnel and floor drain unless otherwise noted.

.4 Locate strainers so they are easily accessible for service.

.5 Install ahead of each automatic control valve and radiation and as indicated on drawing.

.6 Install ahead of each pump.

3.6 WATER HAMMER ARRESTORS

.1 Install on branch supplies to fixtures or group of fixtures and where indicated.

.2 All arrestors shall be accessible. Provide access panels has required.

.3 Provide isolation ball valve.

3.7 INSTALLATION OF PIPE ESCUTCHEON

.1 On pipes passing through walls, partitions, floors and ceilings in finished areas.

.2 Install the plates so that they are tight against the building surface concerned, and ensure that the plates completely cover pipe sleeves and/or openings.

.3 Where sleeve extends above finished floor, escutcheons or plates shall cover sleeve extension

3.8 START-UP

.1 General:

.1 In accordance with Section 00 10 00 – General Instructions.

.2 Timing: start-up only after:

.1 Pressure tests have been completed.

.2 Disinfection procedures have been completed.

.3 Certificate of static completion has been issued.

.4 Water treatment systems operational.

.3 Provide continuous supervision during start-up of all equipment.

3.9 TESTING AND ADJUSTING

.1 General:

.1 Contractor shall be responsible to verify that all equipment operates as per manufacturer specification to the satisfaction of NRC.

.2 Timing:

.1 After start-up deficiencies rectified.

.2 After certificate of completion has been issued by authority having jurisdiction.

.3 Application tolerances:

.1 Pressure at fixtures: +/- 20 kPa.

.2 Flow rate at fixtures: +/- 20%.

.4 Adjustments:

.1 Verify that flow rate and pressure meet design criteria.

.2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.

.5 Vacuum breakers, backflow preventers, backwater valves:

.1 Test tightness, accessibility for O&M of cover and of valve.

.2 Simulate reverse flow and back-pressure conditions to test operation of vacuum breakers, backflow preventers.

.3 Verify visibility of discharge from open ports.

.6 Access doors:

.1 Verify size and location relative to items to be accessed.

.7 Cleanouts:

.1 Verify covers are gas-tight, secure, yet readily removable.

.8 Water hammer arrestors:

.1 Verify proper installation of correct type of water hammer arrester.

.9 Strainers:

.1 Clean out repeatedly until clear.

.2 Verify accessibility of cleanout plug and basket.

.3 Verify that cleanout plug does not leak.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

.3 Section 21 05 01 – Common Work Results- Mechanical

.4 Section 21 07 19 – Thermal Insulation for Piping

.5 Section 22 11 16 – Domestic Water Piping

.6 Section 22 42 01 – Plumbing Specialties and Accessories

.7 Section 23 05 05 – Installation of Pipework

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-B45 Series-[02(R2008)], Plumbing Fixtures.

.2 CAN/CSA-B125.3-[05], Plumbing Fittings.

.3 CAN/CSA-B651-[04], Accessible Design for the Built Environment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for washroom fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Indicate fixtures and trim:

.1 Dimensions, construction details, roughing-in dimensions.

.2 Factory-set water consumption per flush at recommended pressure.

.3 (For water closets, urinals): minimum pressure required for flushing.

1.4 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for washroom fixtures, for incorporation into manual specified in Section 00 10 00 – General Instructions.

.2 Include:

.1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.

.2 Details of operation, servicing, maintenance.

.3 List of recommended spare parts.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.

.2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.3.

.3 Exposed plumbing brass to be chrome plated.

.4 Basis of Design, Number, Locations: as indicated on drawings 5083-M03 and 5083-M04.

.5 Fixtures in any one location to be product of one manufacturer and of same type.

.6 Trim in any one location to be product of one manufacturer and of same type.

.7 Water closets:

WC type	Mounting		Bowl		Flush valve		Flush tank	Handicapped
	Wall	Floor	Elong	Reg	Exp'd	Conc'd		
WC1		X	X	X	X			

.1 WC1 : floor-mounted, flush valve, for handicapped.

.1 Top of seat to be between 400 mm and 460 mm from finished floor.

.2 Bowl: vitreous china, floor mounted, syphon jet, elongated rim, top spud for flush valve, bolt caps.

.3 Refer to schedule on drawing 5083-M04 for basis of design

.4 Acceptable Material: American Standard, Kholer, Crane or approved equal.

.2 Water Closet Flush Valves:

.1 Flush valve: exposed, polished chrome, externally adjustable, diaphragm type with NPS 1 screwdriver angle stop, oscillating handle, wall and spud escutcheons, flush connection and coupling for NPS 1 1/2 top spud, wall and spud escutcheons, seat bumper and vacuum breaker. Ultra low flush cycle: adjustable from 3.8 - 17 litres/ flush, set to 5.7 litres/flush.

.2 Refer to schedule on drawing 5083-M04 for basis of design

.3 Acceptable Material: American Standard, Sloan, Zurn, Moen M, TAC, or approved equal

.3 Water Closet Seats.

.1 Seat: white, elongated, open front, moulded solid plastic, less cover, stainless steel check hinges, stainless steel insert post.

.2 Refer to schedule on drawing 5083-M04 for basis of design

.3 Acceptable Material: Enpoco, American Standard, Crane or approved equal.

.8 Washroom Lavatories:

.1 LAV1 : Wall-hung, integral back:

.1 Vitreous china, with splash lip, soap depressions, supply openings on 100 mm centres, overflow.

.2 Refer to schedule on drawing on drawing 5083-M04 for basis of design

.3 Acceptable Material: American Standard, Kholer, Crane or approved equal.

.9 Washroom Lavatory Trim:

.1 Chrome plated brass, combination supply and waste fittings, mixing spout, washerless, pop-up waste, aerator, metal, indexed handles.

.1 Provide accessories to limit maximum flow rate to 8.35 l/minute at 413 kPa.

.2 Refer to schedule on drawing 5083-M04 for basis of design.

.3 Acceptable Material: American Standard, Delta, Moen, Chicago Faucets, or approved equal.

.10 Fixture piping:

.1 Hot and cold water supplies to fixtures:

.1 Chrome plated flexible supply pipes with handwheel stop, reducers, escutcheon.

.2 Waste:

.1 Brass P trap with clean out on fixtures not having integral trap.

.2 Chrome plated in exposed places.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Mounting heights:

.1 Standard: as indicated on architectural drawings, measured from finished floor and to manufacturer’s recommendations.

3.3 ADJUSTING

.1 Conform to water conservation requirements specified this section.

.2 Adjustments:

.1 Adjust water flow rate to design flow rates.

.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

.3 Adjust flush valves to suit actual site conditions.

.4 Adjust urinal flush timing mechanisms.

.5 Set controls of automatic flush valves for WCs and urinals to prevent unnecessary flush cycles.

.3 Checks:

.1 Water closets, urinals: flushing action.

.2 Aerators: operation, cleanliness.

.3 Vacuum breakers, backflow preventers: operation under all conditions.

.4 Thermostatic controls:

.1 Verify temperature settings, operation of control, limit and safety controls.

3.4 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

.3 Section 21 05 01 – Common Work Results- Mechanical

.4 Section 21 07 19 – Thermal Insulation for Piping

.5 Section 22 11 16 – Domestic Water Piping

.6 Section 22 42 01 – Plumbing Specialties and Accessories

.7 Section 23 05 05 – Installation of Pipework

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA-B45 Series-[02(R2008)], Plumbing Fixtures.

.2 CAN/CSA-B125.3-[05], Plumbing Fittings.

.3 CAN/CSA-B651-[04], Accessible Design for the Built Environment.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for fixtures, and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Provide maintenance data in accordance with Section 00 10 00 – General Instructions.

.2 Include:

.1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.

.2 Details of operation, servicing, maintenance.

.3 List of recommended spare parts.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.

.2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.

.3 Exposed plumbing brass to be chrome plated.

.4 Number, locations: architectural drawings to govern.

.5 Fixtures to be product of one manufacturer.

.6 Trim to be product of one manufacturer.

.7 Mop sinks:

.1 Sink: moulded stone, 300mm (12") high undrilled integral back. Size: 610 x 610 x 254 mm.

.2 Supply fitting: with built-in elevated vacuum breaker, indexed cross handles, 1400 mm long rubber hose, escutcheons, union inlets, heavy cast brass spout with pail hook, aerator, brace to wall, integral stop valves. Provide accessories to limit maximum flow rate to 8.35 l/minute at 413 kPa.

.3 Basis of Design: Refer to schedule on drawing 5083-M04

.4 Acceptable Material: Fiat, Crane, American Standard or approved equal

.8 Stainless steel counter-top sinks.

.1 S1: single compartment, ledge-back.

.1 From 1.0 mm thick type 302 stainless steel, self-rimming, undercoated, clamps. Overall sizes: [520 x 510 x 180] [___] mm.

.2 Trim: chrome plated brass, with swing spout, aerator, single lever handle, washerless controls, accessories to limit maximum flow rate to [8.35] [___] litres/minute at 413 kPa, [spray fitting] [___].

.3 Waste fitting: integral stainless steel basket strainer/stopper, tailpiece, cast brass P-trap with cleanout.

.4 Refer to schedule on drawing 5083-M04.

.5 Acceptable Material- Kindred, American Standard

.9 Fixture piping:

.1 Hot and cold water supplies to each fixture:

.1 Chrome plated flexible supply pipes each with handwheel stop, reducers, escutcheon.

.2 Waste:

.1 Brass P trap with clean out on each fixture not having integral trap.

.2 Chrome plated in all exposed places.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Mounting heights:

.1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.

.2 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA-B651.

3.3 ADJUSTING

.1 Conform to water conservation requirements specified this section.

.2 Adjustments:

.1 Adjust water flow rate to design flow rates.

.2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.

.3 Checks:

.1 Aerators: operation, cleanliness.

.2 Vacuum breakers, backflow preventers: operation under all conditions.

.3 Wash fountains: operation of flow-actuating devices.

.4 Thermostatic controls:

.1 Verify temperature settings, operation of control, limit and safety controls.

3.4 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 10 00 – General Instructions

.2 Section 00 15 45 – General Safety Section and Fire Instructions

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 The contractor is responsibility to coordinate and dispose of all waste material to local provincial and municipality requirements.

.2 It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.

.3 The contractor is responsible for all damaged and stolen material, tools or equipment on site.

.4 The contractor is responsible for the delivery of all material, tools or equipment.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 CONNECTIONS TO EQUIPMENT

.1 In accordance with manufacturer's instructions unless otherwise indicated.

.2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

.3 Use double swing joints when equipment mounted on vibration isolation and when piping subject to movement and when penetrating ceiling/roof and has indicated..

3.3 CLEARANCES

.1 Provide clearance around systems, equipment and components for observation of operation, inspection, testing (x-ray, servicing, maintenance and as recommended by manufacturer.

.2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, components.

3.4 DRAINS

.1 Install piping with grade in direction of flow except as indicated.

.2 Install drain valve at low points in piping systems, at equipment and at section isolating valves.

.3 Pipe each drain valve discharge separately to above floor drain. Discharge to be visible.

.4 Drain valves: NPS 3/4 gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.

3.5 AIR VENTS

.1 Install air vents at high points in piping systems.

.2 Install isolating valve at each air valve.

.3 Install drain piping to approved location and terminate where discharge is visible.

3.6 DIELECTRIC COUPLINGS

.1 General: compatible with system, to suit pressure rating of system.

.2 Locations: where dissimilar metals are joined.

.3 NPS 2 and under: isolating unions or bronze valves.

.4 Over NPS 2: isolating flanges.

3.7 PIPEWORK INSTALLATION

.1 Screwed fittings jointed with Teflon tape.

.2 Protect openings against entry of foreign material.

.3 Install to isolate equipment and allow removal without interrupting operation of other equipment or systems.

.4 Assemble piping using fittings manufactured to ANSI standards.

.5 Saddle type branch fittings may be used on mains if branch line is no larger than half size of main.

.1 Hole saw (or drill) and ream main to maintain full inside diameter of branch line prior to welding saddle.

.6 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.

.7 Install concealed pipework to minimize furring space, maximize headroom, conserve space.

.8 Slope piping, except where indicated, in direction of flow for positive drainage and venting.

.9 Install, except where indicated, to permit separate thermal insulation of each pipe.

.10 Group piping wherever possible.

.11 Ream pipes, remove scale and other foreign material before assembly.

.12 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.

.13 Provide for thermal expansion as indicated.

.14 Valves:

.1 Install in accessible locations.

.2 Remove interior parts before soldering.

.3 Install with stems above horizontal position unless otherwise indicated.

.4 Valves accessible for maintenance without removing adjacent piping.

.5 Install globe valves in bypass around control valves.

.6 Use valves at branch take-offs for isolating purposes except where otherwise specified.

.7 Install butterfly valves between weld neck flanges to ensure full compression of liner.

.8 Install ball valves for glycol service and where indicated.

.9 Use chain operators on valves NPS 2 1/2 and larger where installed more than 2400 mm above floor in Mechanical Rooms.

.15 Check Valves:

.1 Install silent check valves on discharge of pumps in vertical pipes with downward flow and elsewhere as indicated.

.2 Install swing check valves in horizontal lines on discharge of pumps and elsewhere as indicated.

3.8 SLEEVES

.1 General: install where pipes pass through masonry, concrete structures, fire rated assemblies, and elsewhere as indicated.

.2 Material: schedule 40 black steel pipe.

.3 Construction: foundation walls and where sleeves extend above finished floors to have annular fins continuously welded on at mid-point.

.4 Sizes: 6 mm minimum clearance between sleeve and uninsulated pipe or between sleeve and insulation.

.5 Installation:

.1 Concrete, masonry walls, concrete floors on grade: terminate flush with finished surface.

.2 Other floors: terminate 25 mm above finished floor.

.3 Before installation, paint exposed exterior surfaces with heavy application of zinc-rich paint to CAN/CGSB-1.181.

.6 Sealing:

.1 Foundation walls and below grade floors: fire retardant, waterproof non-hardening mastic.

.2 Elsewhere: Provide space for firestopping. Maintain fire rating integrity.

.3 Sleeves installed for future use: fill with lime plaster or other easily removable filler.

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

3.9 ESCUTCHEONS

.1 Install on pipes passing through walls, partitions, floors, and ceilings in finished areas.

.2 Construction: one piece type with set screws. Chrome or nickel plated brass or type 302 stainless steel.

.3 Sizes: outside diameter to cover opening or sleeve. Inside diameter to fit around pipe or outside of insulation if so provided.

3.10 PREPARATION FOR FIRE STOPPING

.1 Material and installation within annular space between pipes, ducts, insulation and adjacent fire separation in accordance with Section 07 84 00 - Fire Stopping.

.2 Uninsulated unheated pipes not subject to movement: No special preparation.

.3 Uninsulated heated pipes subject to movement: wrap with non-combustible smooth material to permit pipe movement without damaging fires topping material or installation.

.4 Insulated pipes and ducts: ensure integrity of insulation and vapour barriers.

3.11 FLUSHING OUT OF PIPING SYSTEMS

.1 Flush system in accordance with good industry standards and as indicated.

3.12 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK

.1 Advise NRC with 48 hours minimum prior to performance of pressure tests.

.2 Pipework: test as specified in relevant sections.

.3 Maintain specified test pressure without loss for 4 hours minimum unless specified for longer period of time in relevant mechanical sections.

.4 Prior to tests, isolate equipment and other parts which are not designed to withstand test pressure or media.

.5 Conduct tests in presence of NRC and has indicated in relevant mechanical sections.

.6 Pay all costs for repairs or replacement, retesting, and making good. NRC to determine whether repair or replacement is appropriate.

.7 Insulate or conceal work only after approval and certification of tests and approved by NRC.

3.13 EXISTING SYSTEMS

.1 Connect into existing piping systems at times approved by NRC.

.2 Request written approval 10 days minimum, prior to commencement of work.

.3 Be responsible for damage to existing plant by this work.

.4 Ensure daily clean-up of existing areas.

3.14 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Electrical motors, drives and guards for mechanical equipment and systems.

.2 Supplier and installer responsibility indicated in Motor, Control and Equipment Schedule on electrical drawings and related mechanical responsibility is indicated on Mechanical Equipment Schedule on mechanical drawings.

.3 Control wiring and conduit is specified in Division 26 except for conduit, wiring and connections below 50 V which are related to control systems specified in Division 22 and 23. Refer to Division 26 for quality of materials and workmanship.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 - General Safety Section and Fire Instructions.

.3 Section 21 05 01 – Common Work Results- Mechanical

.4 Section 23 34 00 – HVAC Fans

.5 Section 23 82 39 – Unit Heaters

1.2 REFERENCES

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

.1 ASHRAE 90.1-[01], Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA cosponsored; ANSI approved; Continuous Maintenance Standard).

.2 Electrical Equipment Manufacturers' Association Council (EEMAC)

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

.1 Submittals: in accordance with Section 00 10 00 – General Instructions

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet. Include product characteristics, performance criteria, and limitations.

.3 Quality Control: in accordance with Section 00 10 00 – General Instructions.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Closeout Submittals

.1 Provide maintenance data for motors, drives and guards for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: work to be performed in compliance with CEPA, and applicable Provincial /Territorial regulations.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 - General Safety Section and Fire Instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

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

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 GENERAL

.1 Motors: high efficiency, in accordance with local Hydro company standards and to ASHRAE 90.1.

2.2 MOTORS

.1 Provide motors for mechanical equipment as specified.

.2 Motors under 373 W [1/2 HP] : speed as indicated, continuous duty, built-in overload protection, resilient mount, single phase, 120V, unless otherwise specified or indicated.

.3 Motors 373 W [1/2 HP] and larger: EEMAC Class B, squirrel cage induction, speed as indicated, continuous duty, drip proof, ball bearing, maximum temperature rise 40 degrees C, 3 phase, 575 V, unless otherwise indicated.

2.3 TEMPORARY MOTORS

.1 If delivery of specified motor will delay completion or commissioning work, install motor approved by Departmental Representative for temporary use. Work will only be accepted when specified motor is installed.

2.4 BELT DRIVES

.1 Fit reinforced belts in sheave matched to drive. Multiple belts to be matched sets.

.2 Use cast iron or steel sheaves secured to shafts with removable keys unless otherwise indicated.

.3 For motors under 7.5 kW (10 HP) : standard adjustable pitch drive sheaves, having plus or minus 10% range. Use mid-position of range for specified r/min.

.4 For motors 7.5 kW (10 HP) and over: sheave with split tapered bushing and keyway having fixed pitch unless specifically required for item concerned. Provide sheave of correct size to suit balancing.

.5 Correct size of sheave determined during commissioning.

.6 Minimum drive rating: 1.5 times nameplate rating on motor. Keep overhung loads within manufacturer's design requirements on prime mover shafts.

.7 Motor slide rail adjustment plates to allow for centre line adjustment.

.8 Supply one set of spare belts for each set installed in accordance with Section 00 10 00 – General Instructions.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Fasten securely in place.

.2 Make removable for servicing, easily returned into, and positively in position.

3.3 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 00 10 00 – General Instructions.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Concrete housekeeping pads, hangers and supports for mechanical piping, ducting and equipment.

1.2 REFERENCES

.1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)

.1 ANSI/ASME B31.1 / B31.3

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A125, Specification for Steel Springs, Helical, Heat-Treated.

.2 ASTM A307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.3 ASTM A563, Specification for Carbon and Alloy Steel Nuts.

.3 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)

.1 MSS SP58, Pipe Hangers and Supports - Materials, Design and Manufacture.

.2 ANSI/MSS SP69, Pipe Hangers and Supports - Selection and Application.

.3 MSS SP89, Pipe Hangers and Supports - Fabrication and Installation Practices.

1.3 SYSTEM DESCRIPTION

.1 Design Requirements:

.1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.

.2 Base maximum load ratings on allowable stresses prescribed by MSS SP58.ASME B31.1 or B31.3 as indicated.

.3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.

.4 Design hangers and supports to support systems under conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.

.5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP58.

.2 Performance Requirements:

.1 Design supports, platforms, catwalks, hangers, to withstand seismic where indicated.

1.4 SUBMITTALS

.1 Submit shop drawings and product data for following items:

.1 Bases, hangers and supports.
.2 Connections to equipment and structure.
.3 Structural assemblies.
.4 Installation instructions

.2 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:

.1 The contractor is responsibility to coordinate and dispose of all waste material to local provincial and municipality requirements.

.2 It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.

.3 The contractor is responsible for all damaged and stolen material, tools or equipment on site.

.4 The contractor is responsible for the delivery of all material, tools or equipment.

Part 2 Products

2.1 GENERAL

.1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS SP58.

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

2.2 PIPE HANGERS

.1 Finishes:

.1 Pipe hangers and supports: galvanized-exterior and painted with zinc-rich paint – interior after manufacture.
.2 Use hot dipped galvanizing process.
.3 Ensure steel hangers in contact with copper piping are copper plated or epoxy coated.

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

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

.1 Rod: 9 mm UL listed

.2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron beam clamp, eye rod, jaws and extension with carbon steel retaining clip, tie rod, nuts and washers, UL listed to MSS-SP58 and MSS-SP69.

.3 Upper attachment structural: suspension from upper flange of I-Beam:

.1 Cold piping NPS 2 maximum: ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed to MSS SP69.

.2 Cold piping NPS 2 1/2 or greater, hot piping: malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nut UL listed.

.4 Upper attachment to concrete:

.1 Ceiling: carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm minimum greater than rod diameter.

.2 Concrete inserts: wedge shaped body with knockout protector plate UL listed to MSS SP69.

.5 Hanger rods: threaded rod material to MSS SP58:

.1 Ensure that hanger rods are subject to tensile loading only.

.2 Provide linkages where lateral or axial movement of pipework is anticipated.Pipe attachments: material to MSS SP58:

.1 Attachments for steel piping: carbon steel galvanized.

.2 Attachments for copper piping: copper plated black steel.

.3 Use insulation shields for hot pipework.

.4 Oversize pipe hangers and supports.

.7 Adjustable clevis: material to MSS SP69 UL listed, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.

.1 Ensure "U" has hole in bottom for rivetting to insulation shields

.8 Yoke style pipe roll: carbon steel yoke, rod and nuts with cast iron roll, to MSS SP69.

.9 U-bolts: carbon steel to MSS SP69 with 2 nuts at each end to ASTM A563.

.1 Finishes for steel pipework: galvanized.

.2 Finishes for copper, glass, brass or aluminum pipework: black with formed portion plastic coated or epoxy coated.

.10 Pipe rollers: cast iron roll and roll stand with carbon steel rod to MSS SP69.Shop and field-fabricated assemblies.

.1 Trapeze hanger assemblies: MSS SP-89.

.2 Steel brackets: MSS SP-89.

.3 Sway braces for seismic restraint systems: to MSS SP-89.

2.3 RISER CLAMPS

.1 Steel or cast iron pipe: galvanized steel to MSS SP58, type 42, UL listed.

.2 Copper pipe: carbon steel copper plated to MSS SP58, type 42.

.3 Bolts: to ASTM A307.

.4 Nuts: to ASTM A563.

2.4 INSULATION PROTECTION SHIELDS

.1 Insulated cold piping:

.1 64 kg/m^3 density insulation plus insulation protection shield to: MSS SP69, galvanized sheet carbon steel. Length designed for maximum 3 m span.

.2 Insulated hot piping:

.1 Curved plate 300 mm long, with edges turned up, welded-in centre plate for pipe sizes NPS 12 and over, carbon steel to comply with MSS SP69.

2.5 CONSTANT SUPPORT SPRING HANGERS

.1 Springs: alloy steel to ASTM A125, shot peened, magnetic particle inspected, with +/-5% spring rate tolerance, tested for free height, spring rate, loaded height and provided with Certified Mill Test Report (CMTR).

.2 Load adjustability: 10 % minimum adjustability each side of calibrated load. Adjustment without special tools. Adjustments not to affect travel capabilities.

.3 Provide upper and lower factory set travel stops.

.4 Provide load adjustment scale for field adjustments.

.5 Total travel to be actual travel + 20%. Difference between total travel and actual travel 25 mm minimum.

.6 Individually calibrated scales on each side of support calibrated prior to shipment, complete with calibration record.

2.6 VARIABLE SUPPORT SPRING HANGERS

.1 Vertical movement: 13 mm minimum, 50 mm maximum, use single spring pre-compressed variable spring hangers.

.2 Vertical movement greater than 50 mm: use double spring pre-compressed variable spring hanger with 2 springs in series in single casing.

.3 Variable spring hanger complete with factory calibrated travel stops. Provide certificate of calibration for each hanger.

.4 Steel alloy springs: to ASTM A125, shot peened, magnetic particle inspected, with +/-5 % spring rate tolerance, tested for free height, spring rate, loaded height and provided with CMTR.

2.7 EQUIPMENT SUPPORTS

.1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of Section 05 12 23 - Structural Steel for Buildings. Submit calculations with shop drawings.

2.8 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

.1 Provide templates to ensure accurate location of anchor bolts.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install in accordance with:

.1 Manufacturer's instructions and recommendations.

.2 Vibration Control Devices:

.1 Install on piping systems at pumps, boilers, chillers, cooling towers, and as indicated.

.3 Clamps on riser piping:

.1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.

.2 Bolt-tightening torques to industry standards.

.3 Steel pipes: install below coupling or shear lugs welded to pipe.

.4 Cast iron pipes: install below joint.

.4 Clevis plates:

.1 Attach to concrete with 4 minimum concrete inserts, one at each corner.

.5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

.6 Use approved constant support type hangers where:

.1 vertical movement of pipework is 13 mm or more,

.2 transfer of load to adjacent hangers or connected equipment is not permitted.

.7 Use variable support spring hangers where:

.1 transfer of load to adjacent piping or to connected equipment is not critical.

.2 variation in supporting effect does not exceed 25 % of total load.

3.3 HANGER SPACING

.1 Plumbing piping: to Canadian Plumbing Code or authority having jurisdiction.

.2 Gas and fuel oil piping: up to NPS 1/2: every 1.8 m.

.3 Copper piping: up to NPS 1/2: every 1.5 m.

.4 Within 300 mm of each elbow.

.5 Pipework greater than NPS 12: to MSS SP69.

.6 Hydronic, steam, steam condensate, compressed air, rigid, and flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.

MAXIMUM HANGER SPACING AND MINIMUM ROD SIZE

O.D		STEEL PIPE				COPPER TUBE		ROD SIZE	
INCHES	mm	WATER		STEAM / AIR				INCH	mm
		FT	METER	FT	METER	FT	METER		
<= 1/2	12.7	7	2.13	8	2.44	5	1.52	1/4'	6.4
3/4'	19.1	7	2.13	9	2.74	5	1.52	1/4'	6.4
1	25.4	7	2.13	9	2.74	6	1.83	1/4'	6.4
1-1/4'	31.7	8	2.44	10	3.05	7	2.13	1/4'	6.4
1-1/2'	38.1	9	2.74	12	3.66	8	2.44	3/8'	9.5
2	50.8	10	3.05	13	3.96	8	2.44	3/8'	9.5
2-1/2'	63.5	11	3.35	14	4.27	9	2.74	3/8'	9.5
3	76.2	12	3.66	15	4.57	10	3.05	3/8'	9.5
4	101.6	14	4.27	17	5.18	12	3.66	1/2'	12.7
6	152.4	17	5.18	21	6.40	14	4.27	1/2'	12.7
8	203.2	19	5.79	24	7.31	16	4.88	5/8'	15.8
10	254.0	20	6.10	26	7.92	18	5.49	3/4'	19.0
12	304.8	23	7.01	30	9.14	19	5.79	7/8'	22.2
14	355.6	25	7.62	32	9.75			1	25.4
16	406.4	27	8.23	35	10.67			1	25.4
18	457.2	28	8.53	37	11.28			1-1/4'	31.7
20	508.0	30	9.14	39	11.89			1-1/4'	31.7

3.4 HANGER INSTALLATION

.1 Install hanger so that rod is vertical under operating conditions.

.2 Adjust hangers to equalize load.

.3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.

3.5 HORIZONTAL MOVEMENT

.1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4 degrees from vertical.

.2 Where horizontal pipe movement is less than 13 mm, offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.6 FINAL ADJUSTMENT

.1 Adjust hangers and supports:

.1 Ensure that rod is vertical under operating conditions.

.2 Equalize loads.

.2 Adjustable clevis:

.1 Tighten hanger load nut securely to ensure proper hanger performance.

.2 Tighten upper nut after adjustment.

.3 C-clamps:

.1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.

.4 Beam clamps:

.1 Hammer jaw firmly against underside of beam.

3.7 FIELD QUALITY CONTROL (as required)

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

1.2 REFERENCES

.1 Definitions:

.1 For purposes of this section:

.1 "CONCEALED" - insulated mechanical services and equipment in suspended ceilings and non-accessible chases and furred-in spaces.

.2 "EXPOSED" - means "not concealed" as previously defined.

.3 Insulation systems - insulation material, fasteners, jackets, and other accessories.

.2 TIAC Codes:

.1 CRD: Code Round Ductwork,

.2 CRF: Code Rectangular Finish.

.2 Reference Standards:

.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 B209M-[07], Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

.2 ASTM C335-[05ae1], Standard Test Method for Steady State Heat Transfer Properties of Pipe Insulation.

.3 ASTM C411-[05], Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation.

.4 ASTM C449/C449M-[00], Standard Specification for Mineral Fiber-Hydraulic-Setting Thermal Insulating and Finishing Cement.

.5 ASTM C547-[07e1], Standard Specification for Mineral Fiber Pipe Insulation.

.6 ASTM C553-[02e1], Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

.7 ASTM C612-[04e1], Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

.8 ASTM C795-[03], Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

.9 ASTM C921-[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], Vapour Barrier, Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.

.4 Green Seal Environmental Standards (GSES)

.1 Standard GS-36-[00], Commercial Adhesives.

.5 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (2005).

.6 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S102-[03], Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.2 CAN/ULC-S701-[05], Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 00 10 00 – General Instructions.

.2 Product Data:

.1 Provide manufacturer's printed product literature and datasheets for duct insulation, and include product characteristics, performance criteria, physical size, finish and limitations.

.1 Description of equipment giving manufacturer's name, type, model, year and capacity.

.2 Details of operation, servicing and maintenance.

.3 Recommended spare parts list.

.3 Manufacturers' Instructions:

.1 Provide manufacture's written duct insulation jointing recommendations. and special handling criteria, installation sequence, cleaning procedures.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: specialist in performing work of this section, and have at least 5 years successful experience in this size and type of project, qualified to standards and member of TIAC.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 FIRE AND SMOKE RATING

.1 To CAN/ULC-S102:

.1 Maximum flame spread rating: 25.

.2 Maximum smoke developed rating: 50.

2.2 INSULATION

.1 Mineral fibre: as specified includes glass fibre, rock wool, slag wool.

.2 Thermal conductivity ("k" factor) not to exceed specified values at 24 degrees C mean temperature when tested in accordance with ASTM C335.

.3 TIAC Code C-1: Rigid mineral fibre board to ASTM C612, [with] [without] factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this Section).

.4 TIAC Code C-2: Mineral fibre blanket to ASTM C553 faced [with] [without] factory applied vapour retarder jacket to CGSB 51-GP-52Ma (as scheduled in PART 3 of this section).

.1 Mineral fibre: to ASTM C553.

.2 Jacket: to CGSB 51-GP-52Ma.

.3 Maximum "k" factor: to ASTM C553.

2.3 JACKETS

.1 Polyvinyl Chloride (PVC):

.1 One-piece moulded type to CAN/CGSB-51.53 with pre-formed shapes as required.
.2 Colours: White
.3 Minimum service temperatures: -20 °C
.4 Maximum service temperature: 65 °C
.5 Moisture vapour transmission: 0.02 perm.
.6 Thickness: 0.3 mm.
.7 Fastenings:
.1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
.2 Pressure sensitive vinyl tape of matching colour.
.8 Special requirements:
.1 Indoor: As indicated.

.2 Outdoor: UV rated material at least 0.5 mm thick

.3 Lagging adhesive: compatible with insulation.

.1 Maximum VOC limit 200g/L.

2.4 ACCESSORIES

.1 Vapour retarder lap adhesive:

.1 Water based, fire retardant type, compatible with insulation.

.1 Maximum VOC limit 200 g/L.

.2 Indoor Vapour Retarder Finish:

.1 Vinyl emulsion type acrylic, compatible with insulation.

.3 Insulating Cement: hydraulic setting on mineral wool, to ASTM C449.

.4 Tape: self-adhesive, aluminum, reinforced, 75 mm wide minimum.

.5 Contact adhesive: quick-setting

.1 Maximum VOC limit 200 g/L.

.6 Tie wire: 1.5 mm stainless steel.

.7 Banding: 19 mm wide, 0.5 mm thick stainless steel.

.8 Facing: 25 mm galvanized steel hexagonal wire mesh stitched on one face of insulation.

.9 Fasteners: 4 mm diameter pins with 35 mm diameter clips, length to suit thickness of insulation.

Part 3 Execution

3.1 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PRE-INSTALLATION REQUIREMENTS

.1 Pressure test ductwork systems complete, witness and certify.

.2 Ensure surfaces are clean, dry, free from foreign material.

3.3 INSTALLATION

.1 Install in accordance with TIAC National Standards.

.2 Apply materials in accordance with manufacturer’s instructions and as indicated.

.3 Use 2 layers with staggered joints when required nominal thickness exceeds 75 mm.

.4 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.

.1 Ensure hangers, and supports are outside vapour retarder jacket.

.5 Hangers and supports in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.

.1 Apply high compressive strength insulation where insulation may be compressed by weight of ductwork.

.6 Fasteners: install at 300 mm on centre in horizontal and vertical directions, minimum 2 rows each side.

3.4 DUCTWORK INSULATION SCHEDULE

.1 Insulation types and thicknesses: conform to following table:

	TIAC Code	Vapour Retarder	Thickness (mm)
Rectangular cold and dual temperature supply	[C-1]	[yes]	[50]

	TIAC Code	Vapour Retarder	Thickness (mm)
air ducts			
Round cold and dual temperatire supply air ducts	[C-2]	[yes]	[50]
Rectangular warm air ducts	[C-1]	[no]	[25]
Round warm air ducts	[C-1]	[no]	[25]
Supply, return and exhaust ducts exposed in space being served			[none]
Outside air ducts to mixing plenum	[C-1]	[yes]	[25]
Mixing plenums	[C-1]	[yes]	[25]
Exhaust duct between dampers and louvres	[C-1]	[no]	[25]

.2 Exposed round ducts 600 mm and larger, smaller sizes where subject to abuse:

.1 Use TIAC code C-1 insulation, scored to suit diameter of duct.

.1 Finishes: conform to following table:

	TIAC Code	
	Rectangular	Round
Indoor, concealed	none	none
Indoor, exposed within mechanical room	CRF/1	CRD/2
Indoor, exposed elsewhere	CRF/2	CRD/3
Outdoor, exposed to precipitation	CRF/3	CRD/4
Outdoor, elsewhere	CRF/4	CRD/5

3.5 CLEANING

.1 Clean in accordance with Section 00 10 00 – General Instructions.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: in accordance with Section 00 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for copper tubing and fittings for refrigerant.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

.3 Section 23 05 01 - Installation of Pipework.

1.2 REFERENCES

.1 American Society of Mechanical Engineers (ASME)

.1 ASME B16.22, Wrought Copper and Copper Alloy Solder - Joint Pressure Fittings.

.2 ASME B16.24, Cast Copper Pipe Flanges and Flanged Fittings: Class 150.

.3 ASME B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes.

.2 American Society for Testing and Materials International (ASTM)

.1 ASTM A307-[04], Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

.2 ASTM B280-[03], Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

.3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

.1 Submittals in accordance with Section 00 10 00 – General Instructions.

.2 Co-ordinate submittal requirements and provide submittals required by Section [01 47 15 - Sustainable Requirements: Construction.

.3 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.

.4 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Instructions: submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Pre-Installation Meeting:

.1 Convene pre-installation meeting one week prior to beginning work. All work and scheduling to be coordinated and approved by NRC.

.1 Verify project requirements.

.2 Review installation conditions.

.3 Co-ordination with other building subtrades.

.4 Review installation instructions and warranty requirements.

.2 Comply with all provincial construction occupational health and safety requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 The contractor is responsibility to coordinate and dispose of all waste material and unused material to local provincial and municipality requirements.

.2 It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.

.3 The contractor is responsible for all damaged and stolen material, tools or equipment on site.

.4 The contractor is responsible for all delivery of material, tools or equipment.

Part 2 Products

2.1 TUBING

.1 -40 to 60 ^{O}C , up to 827 kPa

.2 Above grade : Annealed copper, less than 2 NPS: to ASTM B88, Type L

.3 Below grade : Annealed copper less than 2 NPS to ASTM B88, Type K

.4 Piping construction to ASME B31.1.

2.2 FITTINGS

.1 Service: Design Pressure 125 psig (860 kPa) and temperature -40 to 140^{O}F (-40 to 60^{O}C).

.2 Brazed:

.1 Fittings: wrought copper to ASME B16.22.

.2 Joints: silver solder15% Ag-80% Cu-5%P .

.3 Flared:

.1 Bronze or brass, for refrigeration, to ASME B16.26.

2.3 PIPE SLEEVES

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

2.4 VALVES

.1 Ball valves:

.1 NPS 2 and under:

.1 Screwed ends, Forged Brass, Two piece, Chrome Plated Ball, Blowout Proof Stem, RPTFE Seats, 150 psig (1,034 kPa) Saturated Steam, 600 psig (4237 kPa) WOG, MSS SP-110

.2 To be completed with latch lock leaver device

.3 Standard of acceptance: Apollo- 70-100-27,

.2 NPS 2 and under:

.1 Screwed ends, Stainless steel, Two piece, stainless steel ball, Blowout Proof Stem, RPTFE Seats, 150 psig (1,034 kPa) Saturated Steam, 1000 psig (6,895 kPa) WOG, MSS SP-110

.2 To be completed with latch lock leaver device

.3 Temperature rating: -50 to 450 F (-46 to 232 C)

.4 Standard of acceptance: Flo-Tek – Series S85, Apollo-76-100

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 VALVES:

.1 Install where indicated on drawing and in specifications

.2 Install at all low points when piping is tested with water.

.3 Install as per manufacturer’s recommendations.

3.3 BRAZING PROCEDURES

.1 Bleed inert gas (nitrogen) into pipe during brazing.

.2 Valves are not to be brazed.

.3 Do not apply heat near expansion valve and bulb.

3.4 PIPING INSTALLATION

.1 General:

.1 Soft annealed copper tubing: bend without crimping or constriction

.2 Hard drawn copper tubing: do not bend. Minimize use of fittings.

.3 Contractor shall provide test ports for pressure testing as required.

3.5 PRESSURE AND LEAK TESTING

.1 Close valves and other equipment not designed for test pressures.

.2 Certification and qualifications requirements:

.1 Certificate of authorization from Technical Standard and Safety Association of Ontario (TSSA) to undertake work on process piping B31.1.

2. Provide mill test report for all piping.

3. The contractor is responsible to organize and arrange for all license and welding procedure and welders qualification verification by TSSA inspector. This shall also include TSSA inspector visits for inspections and to witness testing and non-destructive examination and visit fees required by TSSA.

4. Contractor shall bare all costs associated with any modification necessary to meet the requirements of TSSA.

5. Contractor shall be responsible for provision of all labour and material necessary to blank off tested section, and remove items which cannot sustain test pressure. All test procedures to be by ASME 31.1.

6. After hydrostatic test at a minimum pressure of 1.2 times design pressure for 30 minutes, contractor shall ensure that all new piping sections are thoroughly dried off and cleaned from any debris before being put in service.

7. Contractor may perform a pneumatic test at a minimum pressure of 1.2 times design pressure for 30 minutes instead of hydrostatic pending NRC approval.

8. NRC shall be given a minimum of 48 hour notice of all tests.

9. Contractor shall provide records of the tests, data on instrumentation used and calibration of gauges shall be made available to NRC. Range on pressure gauge used for testing shall not exceed 1.25 times test pressure.

10. All piping components provided must have a valid Canadian Registration Number (CRN) recognized by the TSSA. All CRN(s) to be supplied and approved by NRC prior to installation. Contractor shall coordinate with the TSSA inspector time of brazing. TSSA inspector shall be able to wittiness and inspected the brazed fitting and piping fit-up.

3.6 CLEANING

.1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Materials and installation for duct accessories including flexible connections, access doors, vanes and collars.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

1.2 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, [95].

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:

.1 Flexible connections.

.2 Flexible ductwork.

.3 Fire dampers.

.4 Balancing dampers.

.5 Back draft dampers.

.6 Duct access doors.

.7 Turning vanes.

.2 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.1 Certification of ratings: catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

.3 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.4 Instructions: submit manufacturer's installation instructions.

.5 Manufacturer's Field Reports: manufacturer's field reports specified.

.6 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.4 QUALITY ASSURANCE

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting one week prior to beginning work of this Section.

.1 Verify project requirements.

.2 Review installation [and substrate] conditions.

.3 Co-ordination with other building sub-trades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Health and Safety:

.1 Do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and Fire Instructions.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 The contractor is responsibility to coordinate and dispose of all waste material to local provincial and municipality requirements. Refer to section [00 10 00 – General Instructions].

.2 It is the full responsibility of the contractor to insure that all construction material, equipment, tools, etc. are stored and used in a safe and reasonable manor as per good industry standards.

.3 The contractor is responsible for all damaged and stolen material, tools or equipment on site.

.4 The contractor is responsible for all delivery of material, tools or equipment

Part 2 Products

2.1 GENERAL

.1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

2.2 STEEL DUCTWORK

.1 Prime quality galvanized sheet steel with metal gauges in accordance with SMACNA standards to suit the duct configuration and classification.

2.3 FLEXIBLE DUCTWORK – INSULATED

.1 Flexmaster Triple Lock Type V U.L.C. listed flexible ductwork c/w a core of standard triple lock metal flexible ducting, factory supplied glass or mineral wool insulating blanket and an outer jacket of flexible PVC sheet.

.2 Acceptable manufacturers are Flexmaster Ltd., Trans Continental Equipment Ltd., "Al-U-Flex", and Alpha Sheet Metal Co.

2.4 FLEXIBLE CONNECTIONS

.1 Frame: galvanized sheet metal frame 1.6 mm thick with fabric clenched by means of double locked seams.

.2 Material:

.1 Fire resistant, self extinguishing, neoprene coated glass fabric, airtight and moisture proof material, temperature rated at minus 40 degrees C to plus 90 degrees C, density of 1.3kg/m^2.

.3 Acceptable manufacturers are Duro-Dyne Ltd., "Durolon" as above, Ventfabrics "Ventglas" and Elgen Engineering Ltd. "Neoprene".

2.5 FIRE DAMPERS

.1 Nailor-Hart Industries Inc. U.L.C. 1-1/2 hour rated, listed and labelled galvanized steel folding blade fire dampers as follows:

.1 Model No. 0120 in rectangular ductwork less than 350 mm (14") maximum dimension;

.2 Model No. 0110 in rectangular ductwork 350 mm (14") and larger maximum dimension;

.3 Model No. 0130 in round ductwork.

.2 Each fire damper shall be complete with a replaceable 71 degrees C (160 degrees F) fusible link, and a suitable galvanized steel sleeve.

.3 Horizontally mounted fire dampers shall be complete with stainless steel closure springs and positive blade locking devices.

.4 Acceptable manufacturers are Nailor-Hart Industries, Controlled Air Manufacturing, Canada Advanced Air Ltd. and Ruskin (Kerr-Hunt).

2.6 ROUND TO RECTANGULAR DUCT CONNECTIONS

.1 Nailor-Hart Industries Inc. "Spin-In" galvanized steel round to rectangular duct take-off connection collars, Model #1801 where dampers are not required, Model #1802 with integral damper where dampers are required.

.2 Acceptable manufacturers are Nailor-Hart Industries Inc., Controlled Air Manufacturing and Flexmaster Canada Ltd.

2.7 SPIN-IN COLLARS

.1 Conical galvanized sheet metal spin-in collars with lockable butterfly damper.

.2 Sheet metal thickness to co-responding round duct standards.

2.8 SPLITTER DAMPERS

.1 Minimum No. 20 U.S.S. gauge galvanized steel damper blade, reinforced as required to suit blade size and system velocity, each complete with a self-locking splitter damper operating assembly.

2.9 BALANCING DAMPERS

.1 Nailor-Hart Industries Inc. opposed blade galvanized steel control damper, Model No. 1020 for rectangular ductwork, Model No. 1021 for round ductwork, each

complete with No. 16 U.S.S. gauge frame, No. 18 U.S.S. gauge blades, nylon blade shaft bearings, linkage shaft extension, and a suitable and secure damper operator with locking device and visual indication of damper position from the duct exterior.

.2 Acceptable manufacturers are Nailor-Hart Industries Inc., Controlled Air Manufacturing Ltd., Ruskin Ltd., and Air Specialties Manufacturing Ltd.

2.10 BACK DRAFT DAMPERS

.1 Nailor-Hart Industries Inc. 1300 Series gravity type dampers each complete with a galvanized steel frame, aluminum damper blades with felt edges, and lifetime lubricated bearings.

.2 Acceptable manufacturers are Nailor-Hart Industries Inc., Controlled Air Manufacturing Ltd., Ruskin Ltd., and Air Specialties Manufacturing Ltd.

2.11 DUCT ACCESS DOORS

.1 **General:**

.1 Non-insulated sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.7 mm thick (No. 24 gauge) complete with sheet metal angle frame.

.2 Insulated sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.7 mm thick No. 24 gauge) complete with sheet metal angle frame and 25mm (1") thick rigid glass fibre insulation.

.2 Gaskets: neoprene or foam rubber.

.3 **Hardware:**

.1 Up to 300 x 300 mm (12" x 12"): 2 sash locks.

.2 301 to 450 mm (12" x 18"): 4 sash locks [complete with safety chain].

.3 451 to 1000 mm (18" x 40"): piano hinge and minimum 2 sash locks [complete with safety chain].

.4 Doors over 1000 mm (40"): piano hinge and 2 handles operable from both sides.

.5 [[300 x 300] mm glass viewing panels].

2.12 BIRD SCREEN

.1 Heavy gauge galvanized steel or aluminum mesh 12 mm x 12 mm (1/2" x 1/2") sized as indicated on the drawings.

2.13 ACOUSTIC DUCT LINER

.1 **General:**

.1 Fibrous glass duct liner 25 mm (1") thick: air side coated with black neoprene.

.2 Flame spread rating shall not exceed 25. Smoke development rating shall not exceed 50.

.3 Fibrous glass rigid board for rectangular surfaces, fibrous glass blanket for round surfaces.

.2 **Fasteners:**

.1 Duro-Dyne clip pins for installation through the insulation, length to suit the insulation thickness.

.3 Acceptable manufacturers of acoustic duct liner are Fiberglass Canada Ltd., Manville Canada Inc. and Atlas Asbestos Co. Ltd.

2.14 GRILLES, REGISTERS & DIFFUSERS

.1 Grilles, registers and diffusers of the type, size and arrangement as specified on the drawings.

.2 Grilles, registers and diffusers shall be product of one manufacturer.

.3 Catalogued or published ratings shall be those obtained from tests carried out by manufacturer or those ordered by him from independent testing agency signifying adherence to codes and standards.

.4 Acceptable manufacturers are E.H. Price Ltd., Titus Ltd., Air Vector Ltd., Nailor Industries Inc., Krueger Manufacturing Co. and Carnes.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 DUCT, DAMPER & SIMILAR FORMED OPENINGS

.1 Duct openings, air inlet and outlet openings, fire damper openings, etc. will be provided in poured concrete work, masonry, drywall surfaces, etc., by the trade responsible for the particular construction in which the opening is required.

.2 Ensure that openings for fire dampers to 350 mm (14") high are sized to suit the damper arrangement with folding blade out of the air stream.

.2 FABRICATION & INSTALLATION OF STEEL DUCTWORK

.1 Provide all required steel ductwork. Unless otherwise noted, all ductwork shall be constructed of galvanized steel.

.2 Unless specifically noted otherwise, all duct, bends, elbows, transformations, branch fittings, etc. shall be fabricated, sealed and installed in accordance with the 1" water gauge (0.25 kPa) pressure class of the latest edition of SMACNA Hvac Duct Construction Standards, except for duct upstream of VAV boxes, which shall comply with the requirements of the 2" water gauge (0.50 kPa) pressure class.

.3 Install automatic control dampers and similar duct mounted control components supplied as part of the work specified in Section ( ).

.3 FLEXIBLE DUCTWORK

.1 Install flexible ductwork where indicated.

.2 At connections between sheet metal ducts and flexible ducts, provide galvanized steel round to rectangular duct connections as specified hereinbefore.

.3 Install flexible ducts as straight as possible, secure at each end with steel gear type clamps, and seal joints. Where bends are required, they shall be long radius.

.4 Maximum length of flexible duct to be 3m (10').

.4 FLEXIBLE CONNECTIONS

.1 Provide flexible connection in following locations:

.1 Inlets and outlets to supply air units and fans.

.2 Inlets and outlets of exhaust and return air fans.

.3 As indicated.

.2 Length of connection: [150] mm (6”).

.3 Install in accordance with recommendations of SMACNA.

.4 Minimum distance between metal parts when system in operation: 75 mm (3”).

.5 When fan is running:

.1 Ducting on sides of flexible connection to be in alignment.

.2 Ensure slack material in flexible connection.

.5 FIRE DAMPERS

.1 Provide fusible link fire dampers where shown on the drawings.

.2 Supply dampers which are factory secured with a galvanized steel sleeve, or supply the sleeves at the site. Install the dampers by means of No. 4 gauge 20mm (3/4") sheet metal screws at 150 mm (6") O.C.

.3 Secure 12mm x 12mm x 3mm (1/2" x 1/2" x 1/8") steel angles by means of tack welding or bolts to the perimeter of one (1) side of the damper sleeves. Install the sleeves in the opening, then secure angles to the perimeter of the other side of the sleeve at the side of the barrier penetrated by the duct.

.4 Provide expansion clearances between the damper sleeve and the opening in which the damper is required. Ensure that the openings are properly sized and located, and that all voids between the damper sleeve and the opening are properly sealed to maintain the rating of the fire barrier.

.5 Connect and secure ductwork to fire dampers in accordance with the damper manufacturer's recommendations and to NFPA requirements.

.6 SPLITTER DAMPERS

Provide splitter dampers in ductwork where shown and/or specified and/or required to ensure system balancing. Install splitter dampers such that they cannot vibrate and rattle and such that the damper operation mechanism is in an easily operable location.

.7 BALANCING DAMPERS

.1 Provide volume type dampers in all open end ductwork and wherever else shown.

.2 Install the dampers such that the operating mechanism is positioned for easy operation, and such that the dampers cannot move or rattle.

.8 BACK-DRAFT DAMPERS

.1 Provide back-draft dampers in the ductwork where shown.

.2 Install and secure such that the dampers cannot move or rattle.

.9 DUCT ACCESS DOORS

.1 Provide access doors in ductwork for access to all duct system components which will or may need maintenance and/or repair.

.2 Size:

.1 600 x 600 mm for person size entry.

.2 300 x 300 mm for servicing entry.

.3 As indicated.

.3 Locations:

.1 Fire and smoke dampers.

.2 Control dampers.

.3 Devices requiring maintenance.

.4 Required by code.

.4 Identify access doors provided for fusible link fire damper maintenance as such.

.5 Access doors in insulated ductwork shall be sandwich construction type with insulation between the inner and outer panels.

.10 SECURITY SCREEN

.1 Provide security screens where indicated on the drawings.

.11 BIRD SCREEN

.1 Provide galvanized steel or aluminum bird screen over air intake and exhaust air openings in walls where indicated.

.12 ACOUSTIC DUCT LINER

.1 Provide acoustic lining for interior surfaces of ducts where indicated.

.2 Fasten lining to interior sheet metal surfaces with 100% coverage of adhesive.

.3 Install weld pins at 400 mm (16") centres on top and side surfaces and seal all joints, exposed edges, weld pin and clip penetrations and all damaged areas of liners. Cover lining joints with tape secured with 2 coats of sealer.

.4 During installation, take particular care to ensure that the lining coating is not damaged and that exposed lining edges are protected properly such that the lining does not erode when subjected to the velocity in the particular system. Badly damaged areas of lining to be replaced at discretion of the Engineer.

.5 Increase the size of all lined ducts such that interior duct dimensions with lining in place are the dimensions shown and/or specified on the drawings.

.6 Where turning vanes, dampers, etc., occur in lined duct, they must be installed in a manner such that the liner surface is not damaged, the damper operation is not restricted, and friction loss within the duct is not increased.

.13 GRILLES, REGISTERS & DIFFUSERS

.1 Provide grilles and diffusers of the type, size and arrangement specified and shown on the drawings.

.2 Exactly locate grilles and diffusers to conform to the final architectural reflected ceiling plans and detailed wall elevations, and to conform to the final lighting, ceiling layout, ornamental and other wall treatment.

.3 Equip supply diffusers having a basic four-way or all round air pattern for operation in one (1), two (2) or three (3) way pattern where so directed on the drawings.

.4 Confirm finish of grilles, registers and diffusers prior to ordering.

3.3 CLEANING

.1 Perform cleaning operations as specified in Section 00 10 00 – General Instructions and in accordance with manufacturer's recommendations.

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Fans, motors, accessories and hardware for commercial use.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

1.2 REFERENCES

.1 Air Conditioning and Mechanical Contractors (AMCA)

.1 AMCA Publication 99-2003, Standards Handbook.

.2 AMCA 300-1996, Reverberant Room Method for Sound Testing of Fans.

.3 AMCA 301-1990, Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

.2 American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME)

.1 ANSI/AMCA 210-[1999], Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

.3 Canadian General Standards Board (CGSB)

.1 CAN/CGSB 1.181-[99], Ready-Mixed Organic Zinc-Rich Coating.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.3 SYSTEM DESCRIPTION

.1 Performance Requirements:

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards in force.

.2 Capacity: flow rate, total pressure, bhp, efficiency, revolutions per minute, power, model, size, sound power data and as indicated on schedule.

.3 Fans: statically and dynamically balanced, constructed in conformity with AMCA 99.

.4 Sound ratings: comply with AMCA 301, tested to AMCA 300. Supply unit with AMCA certified sound rating seal.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.2 Shop Drawings:

.1 Submit shop drawings and product data in accordance with Section 00 10 00 – General Instructions.

.3 Provide :

.1 Fan performance curves showing point of operation, BHP and efficiency.

.2 Sound rating data at point of operation.

.4 Indicate:

.1 Motors, sheaves, bearings, shaft details.

.2 Minimum performance achievable with variable speed controllers.

.5 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.6 Closeout Submittals:

.1 Provide operation and maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and Fire Instructions.

1.6 MAINTENANCE

.1 Extra Materials:

.1 Provide maintenance materials in accordance with Section 00 10 00 – General Instructions.

.1 Spare parts to include:

.1 Matched sets of belts.

.2 Furnish list of individual manufacturer's recommended spare parts for equipment, include:

.1 Bearings and seals.

.2 Addresses of suppliers.

.3 List of specialized tools necessary for adjusting, repairing or replacing.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

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

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 FANS GENERAL

.1 Motors:

.1 In accordance with Section 23 05 13 - Common Motors Requirements for HVAC Equipment supplemented as specified herein.

.2 For use with variable speed controllers.

.3 Sizes as indicated.

.2 Accessories and hardware: matched sets of V-belt drives, adjustable slide rail motor bases, belt guards, coupling guards fan inlet and outlet safety screens as indicated and as specified in Section 23 05 13 - Common Motor Requirements for HVAC Equipment.

.3 Factory primed before assembly in colour standard to manufacturer.

.4 Scroll casing drains: as indicated.

.5 Bearing lubrication systems plus extension lubrication tubes where bearings are not easily accessible.

.6 Vibration isolation: to Section 23 05 48 - Vibration Controls for HVAC Piping and Equipment.

.7 Flexible connections: to Section 23 33 00 - Air Duct Accessories.

2.2 CENTRIFUGAL FANS

.1 Fan wheels:

.1 Welded steel or aluminum construction.

.2 Maximum operating speed of centrifugal fans not more than 50 % of first critical speed.

.3 Forward curved or backward inclined blades depending on application.

.2 Bearings: heavy duty grease lubricated ball or roller self aligning type with oil retaining, dust excluding seals and a certified minimum rated life of 80,000 hours.

.3 Housings:

.1 Volute with inlet cones: fabricated steel for wheels 300 mm or greater, steel or aluminum, for smaller wheels, braced, and with welded supports.

.2 For horizontally and vertically split housings provide flanges on each section for bolting together, with gaskets of non-oxidizing non-flammable material.

.3 Provide [bolted] [latched] airtight access doors with handles.

.4 Variable volume control devices:

.1 Variable Speed Drives: refer to Section 26 29 23 – Variable Frequency Drive.

2.3 CABINET FANS - GENERAL PURPOSE

.1 Fan characteristics and construction: as centrifugal fans.

.2 Cabinet hung single or multiple wheel with DWDI centrifugal fans in factory fabricated casing complete with vibration isolators and seismic control measures, motor, variable speed, V-belt drive and guard inside casing.

.3 Fabricate casing of zinc coated or phosphate treated steel of 0.6 mm thickness reinforced and braced for rigidity. Provide removable panels for access to interior. Paint uncoated, steel parts with corrosion resistant paint to CAN/CGSB 1.181. Finish inside and out, over prime coat, with rust resistant enamel. Internally line cabinet with 50 mm thick rigid acoustic insulation, pinned and cemented, complete with perforated metal liner.

2.4 UTILITY SETS

.1 Characteristics and construction: for centrifugal fans.

.2 Preassemble single width centrifugal fan with removable weatherproof protective hood with vents, automatic spring loaded back draft dampers and 12 mm mesh birdscreens.

.3 Provide belt driven sets with adjustable motor bed plate and variable pitch driver sheave.

2.5 IN-LINE CENTRIFUGAL FANS

.1 Characteristics and construction: as for centrifugal fan wheels, with axial flow construction and direct or belt drive.

.2 Provide AMCA arrangements 1 or 9 as indicated with stiffened flanges, smooth rounded inlets, and stationary guide vanes.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 FAN INSTALLATION

.1 Install fans as indicated, complete with resilient mountings specified in Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment, flexible electrical leads and flexible connections in accordance with Section 23 33 00 - Air Duct Accessories.

.2 Provide sheaves and belts required for final air balance.

.3 Bearings and extension tubes to be easily accessible.

.4 Access doors and access panels to be easily accessible.

3.3 ANCHOR BOLTS AND TEMPLATES

.1 Size anchor bolts to withstand seismic acceleration and velocity forces.

3.4 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

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

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Variable volume boxes, constant volume bypass, and fan powered and electronic variable air volume boxes.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions

.3 Section 21 05 01 – Common Work Results- Mechanical

.4 Section 21 05 02 – Mechanical Identification

.5 Section 23 05 13 – Common Motor Requirements for HVAC

.6 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC

1.2 REFERENCES

.1 American National Standards Institute (ANSI)

.1 ANSI/AMCA 210-[1999], Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.

.2 ANSI/NFPA 90A-[2002], Standard for the Installation of Air Conditioning and Ventilating Systems.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.3 Underwriter's Laboratories (UL)

.1 UL 181-2003, Factory-Made Air Ducts and Air Connectors.

1.3 SYSTEM DESCRIPTION

.1 Performance Requirements:

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from certified ADC (Air Diffusion Council) testing agency signifying adherence to codes and standards.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.2 Test data: to ANSI/AMCA 210.

.1 Submit published test data on DIN (Direct Internal Noise), in accordance with ISO 3741 made by independent testing agency for 0, 2.5 and 6 m/s branch velocity or inlet velocity.

.2 Pressure loss through silencer shall not exceed 60% of inlet velocity pressure maximum (if applicable).

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 00 10 00 – General Instructions.

.2 Indicate the following:

.1 Capacity.

.2 Pressure drop.

.3 Noise rating.

.4 Leakage.

.5 Manufacturer.

.3 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions.

.4 Closeout Submittals:

.1 Provide maintenance data for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and Fire Instructions.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

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

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

1.7 MAINTENANCE

.1 Extra Materials:

.1 Furnish list of individual manufacturer's recommended spare parts for equipment include:

.1 Bearings and seals.

.2 Addresses of suppliers.

.3 List of specialized tools necessary for adjusting, repairing or replacing.

Part 2 Products

2.1 MANUFACTURED UNITS

.1 Terminal units of the same type to be product of one manufacturer.

2.2 ELECTRONIC DUAL DUCT VARIABLE AIR VOLUME BOXES

.1 Pressure independent, reset to air flow between zero and maximum air volume.

.2 Air velocity sensor resistance wire or pitot rack as standard to manufacturer.

.3 Signals between temperature sensing device, velocity controller, velocity sensor and damper actuator digital as indicated. Shielded or twisted wire requirements is not acceptable.

.4 Electronic thermostat furnished by NRC standing offer contractor (Airtron) and have set points and velocity adjustments located in thermostat. Heating and cooling set point range 18 to 24 degrees C. Set points not overlapping..

.5 Electronic control package factory calibrated and set at factory. Features to accommodate field calibration and readjustment of air volume settings to include:

.1 Metre taps for balancing with digital DC voltmeter.

.2 Adjustable flow settings at thermostat.

.6 Factory installed 20 VA transformer, 115 V to 24 V. Power consumption of terminal not to exceed 15 VA.

.7 Terminal unit to be CSA certified.

.8 Casing: 0.644 mm thick galvanized steel, internally lined with 20 mm. 0.7 kg density fibrous glass, to UL 181 and ANSI/NFPA 90A. Mount control components inside protective metal shroud.

.9 Damper: Heavy gauge steel with peripheral gasket and self lubricating bearings. Air leakage past closed damper not to exceed 2% of nominal rating at 750 Pa inlet static pressure, in accordance with Air Diffusion Council test procedure.

.10 Sizes and capacity: as indicated on schedule in drawing 5083-M03.

.11 Acceptable Material: EH Price model DDS, Nailor, Titus or approved equal.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install in accordance with manufacturers recommendations.

.2 Support independently of ductwork.

.3 Install with at least 1000 mm of flexible inlet ducting and minimum of four duct diameters of straight inlet duct, same size as inlet.

.4 Locate controls, dampers and access panels for easy access.

3.3 FIELD QUALITY CONTROL

3.4 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions.

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

.3 Contractor to vacuum and clean existing supply and return ductwork, supply plenums and branch ductwork in areas of work to remove accumulated dust and construction debris

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Supply, return and exhaust grilles and registers, diffusers and linear grilles, for commercial and residential use.

.2 Related Sections:

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions

.3 Section 21 05 01 – Common Work Results- Mechanical

.4 Section 21 05 02 – Mechanical Identification

.5 Section 23 05 13 – Common Motor Requirements for HVAC

.6 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC

1.2 SYSTEM DESCRIPTION

.1 Performance Requirements:

.1 Catalogued or published ratings for manufactured items: obtained from tests carried out by manufacturer or those ordered by manufacturer from independent testing agency signifying adherence to codes and standards.

1.3 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 00 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.

.2 Indicate following:

.1 Capacity.

.2 Throw and terminal velocity.

.3 Noise criteria.

.4 Pressure drop.

.5 Neck velocity.

.2 Quality assurance submittals: submit following in accordance with Section 00 10 00 – General Instructions.

1.4 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 00 15 45 – General Safety Section and Fire Instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle in accordance with Section 00 10 00 – General Instructions.

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

.2 Waste Management and Disposal:

.1 Construction/Demolition Waste Management and Disposal: in accordance with Section 00 10 00 – General Instructions.

Part 2 Products

2.1 GENERAL

.1 To meet capacity, pressure drop, terminal velocity, throw, noise level, neck velocity.

.2 Frames:

.1 Full perimeter gaskets.

.2 Plaster frames where set into plaster or gypsum board.

.3 Concealed fasteners.

.3 Concealed manual volume control damper operators.

.4 Colour: Typically white or as directed by Departmental Representative.

.5 All new and existing diffusers, grilles and registers as well as any associated ductwork is to be cleaned and vacuumed (within vacuum hose length)

.6 Refer to drawing 5083-M02 for diffuser and grille schedule(s), basis of design and acceptable material

2.2 MANUFACTURED UNITS

.1 Grilles, registers and diffusers of same generic type, products of one manufacturer.

2.3 RETURN AND EXHAUST GRILLES AND REGISTERS

.1 General: with opposed blade dampers.

.2 Type RG1, RG2, RG3, RG4 and RG5: egg-crate style with plenum box, aluminum construction, 19 mm border, Finish: White. Acceptable Material: EH Price Model 80, Titus, Nailor or approved equal.

.3 Type RG6: Louver, aluminum construction, 19mm border, 19mm spacing, single 45 degrees deflection, blades to run parallel to long edge, vertical re-enforcing bars as required, provide balancing damper. Finish: White or brushed aluminium, to be confirmed by NRC representative before ordering. Acceptable Material: EH Price Model 630, Titus, Nailor or approved equal.

2.4 DIFFUSERS

.1 General: volume control dampers with flow straightening devices, blank-off quadrants if required and gaskets. Refer to schedule on drawing 5083-M02 for sizes and capacities of all diffusers.

.2 Type SD1,SD2 and SD3: 450mm nominal diameter, heavy gauge steel, round type, having adjustable pattern, surface mounted. Finish: White .Acceptable Material: EH Price Model RCD, Titus, Nailor or approved equal. NOTE: all diffusers to have the exterior diameter, only inlets on the neck to change.

.3 Type SD4, SD5 and SD6: 600mm x 600mm, heavy gauge aluminum, square type, having adjustable pattern, lay-in mounted. Finish: White. Acceptable Material: EH Price Model PDN, Titus, Nailor or approved equal.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install in accordance with manufacturer’s instructions.

.2 Install with oval head, stainless steel screws in countersunk holes where fastenings are visible.

.3 Bolt grilles, registers and diffusers, in place, in gymnasium and similar game rooms.

3.3 CLEANING

.1 Proceed in accordance with Section 00 10 00 – General Instructions

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 00 10 00 – General Instructions.

.2 Section 00 15 45 – General Safety Section and Fire Instructions.

1.2 PRODUCT DATA

.1 Submit product data in accordance with Section 00 10 00 – General Instructions.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 00 15 45 – General Safety Section and Fire Instructions.

.3 Submit product data sheets for unit heaters. Include:

.1 Product characteristics.
.2 Performance criteria.
.3 Mounting methods.
.4 Physical size.
.5 kW rating, voltage, phase.
.6 Cabinet material thicknesses.
.7 Limitations.
.8 Colour and finish.

.4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 00 10 00 – General Instructions.

.2 Indicate:

.1 Equipment, capacity and piping connections.
.2 Dimensions, internal and external construction details, recommended method of installation with proposed supports, sizes and location of mounting bolt holes.

1.4 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for unit heaters for incorporation into manual specified in Section 00 10 00 – General Instructions.

1.5 WASTE MANAGEMENT AND DISPOSAL

.1 In accordance with Section 00 10 00 – General Instructions

Part 2 Products

2.1 HORIZONTAL UNIT HEATERS

.1 Basis of Design and acceptable manufacturers:

.1 Daikin UHH-108, Reznor, Trane, Volcano or approved equal .

.2 Casing: 1.02 mm thick cold rolled steel, gloss enamel finish, with threaded connections for hanger rods.

.3 Coils: seamless copper tubing, silver brazed to steel headers with evenly spaced aluminum fins mechanically bonded to tubing. Hydrostatically test to 1 MPa. Headers to have external threaded NPT connection

.4 Fan: direct drive propeller type, factory balanced, with anti-corrosive finish and fan guard.

.5 Motor: speed as indicated continuous duty, built-in overload protection, and resilient motor supports.

.6 Air outlet: four-way adjustable louvres.

.7 Capacity: as indicated on drawing 5083-M04

.8 Control room thermostat: electric, low voltage, locking cover, set point locking device, concealed adjustment, brushed aluminum cover, thermometer in cover.

Part 3 Execution

3.1 INSTALLATION

.1 Install in accordance with manufacturer's instructions.

.2 Provide double swing pipe joints as indicated.

.3 Check final location with NRC representative if different from that indicated prior to installation.

.1 Should deviations beyond allowable clearances arise, request and follow NRC’s representative’s directive.

.4 Hot water units: for each unit, install ball valve on inlet and calibrated balancing valve on outlet of each unit. Install drain valve at low point.

.1 Install manual air vent at high point.

.5 Clean finned tubes and comb straight.

.6 Provide supplementary suspension steel as required.

.7 Install thermostats in locations indicated.

.8 Before acceptance, set discharge patterns and fan speeds to suit requirements.

END OF SECTION

Part 1 General

1.1 SUMMARY

1.2 REFERENCES

.1 American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME).

.1 ANSI/ASME B1.20.1, Pipe Threads, General Purpose (Inch).

.2 ANSI/ASME B16.18, Cast Copper Alloy Solder Joint Pressure Fittings.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM A276, Specification for Stainless Steel Bars and Shapes.

.2 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.

.3 ASTM B283, Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).

.4 ASTM B505/B505M, Specification for Copper-Base Alloy Continuous Castings.

.3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).

.1 MSS-SP-25, Standard Marking System for Valves, Fittings, Flanges and Unions.

.2 MSS-SP-80, Bronze Gate Globe, Angle and Check Valves.

.3 MSS-SP-110, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

1.3 SUBMITTALS

.1 Contractor shall submit detailed shop drawings for all valves for NRC review.

.2 Shop drawings shall include but not limited to the following:

.1 Fitting type

.2 Material for valve body and internals

.3 ASME Class

.3 Valve shall not be purchased until shop drawing has been approved by NRC.

1.4 QUALITY ASSURANCE

.1 Health and Safety:

.1 See Section 01545 - Safety Requirements.

1.5 DELIVERY STORAGE AND DISPOSAL

.1 See Section 01000

1.6 MAINTENANCE

.1 Furnish following spares

.1 Valves: supply NRC with one spare valve for every 10 valves provided

Part 2 Products

2.1 MATERIALS

.1 Valves:

.1 Except for specialty valves, to be single manufacturer.

.2 All valves on steam and compressed air above at or above 15 psig shall have Canadian Registration Number (CRN#)

.2 End Connections:

.1 Connection into adjacent piping/tubing:

.1 Steel pipe systems: Screwed ends to ANSI/ASME B1.20.1.

.2 Copper tube systems: Solder ends to ANSI/ASME B16.18.

.3 Lockshield Keys:

.1 Where lockshield valves are specified, provide 2 keys of each size: malleable iron cadmium plated.

.4 Gate Valves:

.1 Requirements common to gate valves, unless specified otherwise:

.1 Standard specification: MSS SP-80 Type 2, MSS SP-70.

.2 Bonnet: union with hexagonal shoulders.

.3 Connections: screwed with hexagonal shoulders.

.4 Packing: non-asbestos.

.5 Handwheel: non-ferrous.

.6 Handwheel Nut: bronze to ASTM B62.

.2 NPS 2 and under-screwed, rising stem, solid wedge disc, Class 150:

.1 Body: with long disc guides, screwed bonnet.

.2 Operator: Handwheel.

.3 NPS 2 and under-soldered, rising stem, solid wedge disc, Class 150:

.1 Body: with long disc guides, screwed bonnet.

.2 Operator: Handwheel.

.5 Globe Valves:

.1 Requirements common to globe valves, unless specified otherwise:

.1 Standard specification: MSS SP-80.

.2 Bonnet: union with hexagonal shoulders.

.3 Connections: screwed with hexagonal shoulders.

.4 Stuffing box: threaded to bonnet with gland follower, packing nut, high grade non-asbestos packing.

.5 Handwheel: non-ferrous.

.6 Handwheel Nut: bronze to ASTM B62.

.2 NPS 2 and under, plug disc, Class 150, screwed:

.1 Body and bonnet: union bonnet.

.2 Inside screw and rising stem

.3 Disc and seat ring: tapered plug type with disc stem ring.

.4 Operator: Handwheel.

.6 Swing Check Valves:

.1 NPS 2 and under, Class 150, screwed

.1 To MSS SP-80 and ANSI B1.20.1.

.2 Body: Y-pattern with integral seat at 45 degrees, screw-in cap with hex head.

.3 Disc and seat: renewable rotating disc, two-piece hinge disc construction; seat:NPS 2 and under, Class 150, soldered

.1 To MSS SP-80 and ANSI B16.18.

.2 Body: Y-pattern with integral seat at 45 degrees, screw-in cap with hex head.

.3 Disc and seat: renewable rotating disc, two-piece hinge disc construction; seat:Silent Check Valves:

.1 NPS 2 and under, screwed ends:

.1 Body: cast high tensile bronze to ASTM B62 with integral seat.

.2 Minimum pressure rating: Class 150.

.3 Connections: screwed ends to ANSI B1.20.1 and with hex. shoulders.

.4 Disc and seat: renewable rotating disc.

.5 Stainless steel spring, heavy duty.

.6 Seat: regrindable.

.8 Ball Valves:

.1 NPS 2 and under, threaded ends:

.1 Body and cap: cast high tensile bronze

.2 Chrome plated brass ball, RPTFE seat.

.3 Minimum pressure rating: 1000 kPa saturated steam, 4130 kPa WOG

.4 *Valves to be complete with minimal 31 mm stem extension for all insulated pipes, see section 21 07 19 THERMAL INSULATION FOR PIPING*

.5 Operator: steel lever handle with securely attached vinyl grip

.6 Connections: Screwed ends to ANSI B1.20.1 and with hexagonal shoulders

.2 NPS 2 and under, soldered ends:

.1 Body and cap: cast high tensile bronze

.2 Chrome plated brass ball, RPTFE seat.

.3 Minimum pressure rating: 1000 kPa saturated steam, 4130 kPa WOG

.4 *Valves to be complete with minimal 31 mm stem extension for all insulated pipes, see section 21 07 19 THERMAL INSULATION FOR PIPING*

.5 Operator: steel lever handle with securely attached vinyl grip

.6 All internals to be removed prior to soldering.

.7 Connections: solder ends to ANSI. Soldered ends to ANSI B16.18, solder ends to ANSI.

.9 Circuit Balancing Valves:

.1 NPS 2 and under, screwedends:

.1 Y-pattern, bronze body c/w two brass metering ports, memory feature and capable of precise flow measurement, flow balancing and drip tight shut-off.

Part 3 Execution

3.1 INSTALLATION

.1 Install rising stem valves in upright position with stem above horizontal.

.2 Where soldered values are used contractor shall remove internal parts before soldering. Before soldering, installation shall be inspected by NRC.

.3 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance and equipment removal.

.4 No valve shall be insulated until all pressure tests relating to valve are completed and approved by NRC.

END OF SECTION

1 REFERENCES

.1 Perform all work to meet or exceed the requirements of the Canadian Electrical Code, CSA Standard C22.1 - (latest edition).

.2 Consider CSA Electrical Bulletins in force at time of tender submission, while not identified and specified by number in this Division, to be forming part of related CSA Part II standard.

.3 Do overhead and underground systems in accordance with CSA C22.3 except where specified otherwise.

.4 Where requirements of this specification exceed those of above mentioned standards, this specification shall govern.

.5 Notify the NRC Departmental Representative as soon as possible when requested to connect equipment supplied by NRC which is not CSA approved.

.6 Refer to Sections 00 10 00 & 0015 45.

2 PERMITS AND FEES

.1 Submit to Electrical Inspection Department and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.

.2 Pay all fees required for the performance of the work.

3 START-UP

.1 Instruct the NRC Departmental Representative and operating personnel in the operation, care and maintenance of equipment supplied under this contract.

4 INSPECTION AND FEES

.1 Furnish a Certificate of Acceptance from the Authorized Electrical Inspection Department on completion of work.

.2 Request and obtain Special Inspection approval from the Authorized Electrical Inspection Department for any non-CSA approved control panels or other equipment fabricated by the contractor as part of this contract.

.3 Pay all fees required for inspections.

5 FINISHES

.1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning, application of rust resistant primer inside and outside, and at least two coats of finish enamel.

.1 Outdoor electrical equipment "equipment green" finish to EEMAC Y1-1-1955.

.2 Indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1-1958.

.2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

6 ACOUSTICAL PERFORMANCE

.1 In general provide equipment producing minimal sound levels in accordance with the best and latest practices established by the electrical industry.

.2 Do not install any device or equipment containing a magnetic flux path metallic core, such as gas discharge lamp ballasts, dimmers, solenoids, etc., which are found to produce a noise level exceeding that of comparable available equipment.

7 EQUIPMENT IDENTIFICATION

.1 Identify with 3mm (1/8") Brother, P-Touch non-smearing tape, or an alternate approved by the NRC Departmental Representative, all electrical outlets shown on drawings and/or mentioned in the specifications. These are the lighting switches, recessed and surface mounted receptacles such as those in offices and service rooms and used to plug in office equipment, telecommunication equipment or small portable tools. Indicate only the source of power (Ex. for a receptacle fed from panel L32 circuit #1: "L32-1").

.2 Light fixtures are the only exceptions for electrical equipment identification (except as noted in 7.13 below). They are not to be identified.

.3 Identify with lamicoid nameplates all electrical equipment shown on the drawings and/or mentioned in the specification such as motor control centers, switchgear, splitters, fused switches, isolation switches, motor starting switches, starters, panelboards, transformers, high voltage cables, industrial type receptacles, junction boxes, control panels, etc., regardless of whether or not the electrical equipment was furnished under this section of the specification.

.4 Coordinate names of equipment and systems with other Divisions to ensure that names and numbers match.

.5 Wording on lamicoid nameplates to be approved by the NRC Departmental Representative prior to fabrication.

.6 Provide two sets of lamicoid nameplates for each piece of equipment; one in English and one in French.

.7 Lamicoid nameplates shall identify the equipment, the voltage characteristics and the power source for the equipment. Example: A new 120/240 volt single phase circuit breaker panelboard, L16, is fed from panelboard LD1 circuit 10.

"PANEL L16
120/240 V
FED FROM LD1-10"

PANNEAU L16
120/240 V
ALIMENTE PAR LD1-10

.8 Provide warning labels for equipment fed from two or more sources - "DANGER MULTIPLE POWER FEED" black letters on a yellow background. These labels are available from NRC's Facilities Maintenance group in building M-19.

.9 Lamicoid nameplates shall be rigid lamicoid, minimum 1.5 mm (1/16") thick with:

.1 Black letters engraved on a white background for normal power circuits.

.2 Black letters engraved on a yellow background for emergency power circuits.

.3 White letters engraved on a red background for fire alarm equipment.

.10 For all interior lamicoid nameplates, mount nameplates using two-sided tape.

.11 For all exterior lamicoid nameplates, mount nameplates using self-tapping 2.3 mm (3/32") dia. slot head screws - two per nameplate for nameplates under 75 mm (3") in height and a minimum of 4 for larger nameplates. Holes in lamicoid nameplates to be 3.7 mm (3/16") diameter to allow for expansion of lamicoid due to exterior conditions.

.1 No drilling is to be done on live equipment.

.2 Metal filings from drilling are to be vacuumed from the enclosure interiors.

.12 All lamicoid nameplates shall have a minimum border of 3 mm (1/8"). Characters shall be 9 mm (3/8") in size unless otherwise specified.

.13 Identify lighting fixtures which are connected to emergency power with a label "EMERGENCY LIGHTING/ÉCLAIRAGE D'URGENCE", black letters on a yellow background. These labels are available from NRC's Facilities Maintenance group in building M-19.

.14 Provide neatly typed updated circuit directories in a plastic holder on the inside door of new panelboards.

.15 Carefully update panelboard circuit directories whenever adding, deleting, or modifying existing circuitry.

8 WIRING IDENTIFICATION

.1 Unless otherwise specified, identify wiring with permanent indelible identifying markings, using either numbered or coloured plastic tapes on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

9 CONDUIT AND CABLE IDENTIFICATION

.1 All new conduits to be colour-coded EMT, type as follows:

.1 Fire alarm – red conduit

.2 Emergency power circuits – yellow conduit

.3 Voice/data – blue conduit

.4 Gas detection system – purple conduit

.5 Building Automation system – orange conduit

.6 Security system – green conduit

.7 Other Control system – black conduit

.2 Apply paint to the covers of junction boxes and condulets of existing conduits as follows:

.1 Fire alarm – red
.2 Emergency power circuits – yellow
.3 Voice/data – blue
.4 Gas detection system – purple
.5 Building Automation system – orange
.6 Security system – green
.7 Other Control system - black

.3 For system running with cable, half-lap wrap with dedicated coloured PVC tape to 100 mm width, tape every 5 m and both sides where cable penetrates a wall.

.4 All other systems need not be coloured.

10 MANUFACTURER'S & APPROVALS LABELS

.1 Ensure that manufacturer's registration plates are properly affixed to all apparatus showing the size, name of equipment, serial number, and all information usually provided, including voltage, cycle, phase and the name and address of the manufacturer.

.2 Do not paint over registration plates or approval labels. Leave openings through insulation for viewing the plates. Contractor's or sub-contractor's nameplate not acceptable.

11 WARNING SIGNS AND PROTECTION

.1 Provide warning signs, as specified or to meet requirements of Authorized Electrical Inspection Department and NRC Departmental Representative.

.2 Accept the responsibility to protect those working on the project from any physical danger due to exposed live equipment such as panel mains, outlet wiring, etc. Shield and mark all live parts with the appropriate voltage. Caution notices shall be worded in both English and French.

12 LOAD BALANCE

.1 Measure phase current to new panelboards with normal loads operating at time of acceptance. Adjust branch circuit connections as required to obtain best balance of current between phases and record changes, and revise panelboard schedules.

.2 Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.

13 MOTOR ROTATION

.1 For new motors, ensure that motor rotation matches the requirements of the driven equipment.

.2 For existing motors, check rotation before making wiring changes in order to ensure correct rotation upon completion of the job.

14 GROUNDING

.1 Thoroughly ground all electrical equipment, cabinets, metal supporting frames, ventilating ducts and other apparatus where grounding is required in accordance with the requirements of the latest edition of the Canadian Electrical Code Part 1, C.S.A. C22.1 and corresponding Provincial and Municipal regulations. Do not depend upon conduits to provide the ground circuits.

.2 Run separate green insulated stranded copper grounding conductors in all electrical conduits including those feeding toggle switches and receptacles.

15 TESTS

.1 Provide any materials, equipment and labour required and make such tests deemed necessary to show proper execution of this work, in the presence of the NRC Departmental Representative.

.2 Correct any defects or deficiencies discovered in the work in an approved manner at no additional expense to the Owner.

.3 Megger all branch circuits and feeders using a 600V tester for 240V circuits and a 1000V tester for 600V circuits. If the resistance to ground is less than permitted by Table 24 of the Code, consider such circuits defective and do not energize.

.4 The final approval of insulation between conductors and ground, and the efficiency of the grounding system is left to the discretion of the local Electrical Inspection Department.

16 COORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, fuses, are installed to values and settings as indicated on the Drawings.

17 WORK ON LIVE EQUIPMENT & PANELS

.1 NRC requires that work be performed on non-energized equipment, installation, conductors and power panels. For purposes of quotation assume that all work is to be done after normal working hours and that equipment, installation, conductors and power panels are to be de-energized when worked upon.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

Part 2 Products

2.1 BUILDING WIRES AND GENERAL REQUIREMENTS

.1 Conductor material for branch circuit wiring and grounding:

- .1 Stranded copper.
- .2 Neutral wire: continuous throughout its length without breaks.
- .3 Separate insulated green grounding conductors in all electrical conduits.
- .4 All wire and cable insulation shall meet the C.S.A. Standards for the types and services hereinafter specified. Colours as per section 4-036 of Electrical Code.
- .5 Where otherwise specified, use wire and cable types as follows:
  - .1 Type R90 XLPE cross-link polyethylene stranded for applications using wires sized No. 8 and larger.
  - .2 Type T90 stranded for applications using wires sized No. 10 and smaller.
  - .3 For fire alarm wiring refer to Section 283100.
  - .4 Approved heat resistant wire for wiring through and at lighting and heating fixtures. Where insulation types are shown on the drawings other types shall not be used unless the specification is more restrictive.
- .6 Use BX cable only under the following conditions:
  - .1 Wiring from a junction box to a recessed lighting fixture in suspended ceilings. Cable length not to exceed 1.5 m (5'), or
  - .2 Wiring or switches or 15 amp receptacles in partitions having removable wall panels, or
  - .3 When specifically called for on drawings.
- .7 Use stranded wire no smaller than No. 12 AWG for lighting and power and no smaller than No. 16 AWG for control wiring.
- .8 Conductors shall be soft copper properly refined and tinned having a minimum conductivity of 98%.

Part 3 Execution

3.1 BUILDING WIRES

.1 Install building wires as follows:

.1 Make joints, taps and splices in approved boxes with solderless connectors. Joints and/or splices are not acceptable inside a panelboard.

.2 Ensure the lugs accommodate all the strands of the conductor.

.3 Replace any wire or cable showing evidence of mechanical injury.

.4 Use No. 10 AWG for branch circuit wiring extending more than 30 m (100 ft.) to farthest outlet from panel.

.5 Circuit numbers indicated on the drawing are intended as a guide for the proper connection of multi-wire circuits at the panel.

.6 Take care to keep the conductors free from twisting.

.7 Use an approved lubricant for pulling in conduit.

.8 Leave sufficient slack on all runs to permit proper splicing and connection of electrical devices.

.9 Branch circuit wiring of 120 volt applications to be multi-wire utilizing common neutrals. Under no condition shall any switch break a neutral conductor.

.10 Provide and install an approved fire- retardant wrap or coating for PVC jacketed cables installed in a grouped configuration of two or more.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

Part 2 Products

2.1 WIRE AND BOX CONNECTORS

.1 Pressure type wire connectors sized to fit conductors.

2.2 WIRING TERMINATIONS

.1 Provide first grade wire and cable connectors suitable for the service on which they are used and install them in accordance with the latest trade practice.

.2 Provide high quality extruded copper-free aluminium (0.4% or less) connectors for single and multi conductor cable. Steel and then zinc plated connectors for multi conductor cables.

.3 When used in hazardous area, connectors should be certified for such location in Class, Division and Group.

.4 For large conductor sizes, use bolted or compression solderless type connectors.

.5 Use high temperature connectors and insulation on all connections of high temperature conductors.

.6 Where connector types are called for on the drawings or in the specification, do not use other types.

.7 Lugs, terminals, screws used for termination of wiring to be suitable for copper conductors.

.8 For fire alarm wiring refer to Section 28 31 00.

Part 3 Execution

3.1 INSTALLATION

.1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.

.2 Bond and ground as required [to CSA C22.2No.41].

END OF SECTION

PART 1 - GENERAL

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-09, Canadian Electrical Code, Part 1, 21st Edition

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings: in accordance with Section 01 33 00.

.1 Provide drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse and recycling in accordance with Section 01 11 01, 01 74 20.

PART 2 - PRODUCTS

2.1 SPLITTERS

.1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.

.2 Terminations: main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.

.3 Spare Terminals: minimum three spare terminals or lugs on each connection or lug block sized less than 400 A.

2.2 JUNCTION AND PULL BOXES

.1 Construction: welded steel enclosure.

.2 Covers Surface Mounted: screw-on flat, turned edge covers

PART 3 - EXECUTION

3.1 SPLITTER INSTALLATION

.1 Mount plumb, true and square to building lines.

.2 Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Install terminal block as indicated in Type T cabinets.

.3 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1

3.3 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00].

.2 Identification Labels: size 2 indicating system name, voltage and phase or as indicated

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative’s approval.

Part 2 Products

2.1 FITTINGS

.1 Fittings: manufactured for use with conduit specified. Coating: same as conduit.

.2 Steel coupling for EMT.

.3 Fittings for liquid-tight flexible conduits shall be liquid-tight connectors.

.4 Provide expansion couplings for all conduits running in slabs through expansion joints. These shall be the type approved for use in concrete with a bonding conductor.

.5 Factory bends are not permitted to be modified. Ensure conduit bends other than factory bends are made with an approved bender. Making offsets and other bends by cutting and rejoining factory bends are not permitted.

2.2 OUTLET BOXES

.1 Size boxes in accordance with CSA-C22.

.2 Unless otherwise specified, provide galvanized steel outlet boxes at least 40mm (1-1/2") deep, single or ganged style, of proper size to accommodate devices used and shall be equipped with covers as necessary of the type designed for the specified fittings. Pull boxes shall be steel and shall be galvanized or painted to prevent rusting. For lighting fixture outlets, use 100mm (4") octagon boxes.

.3 Equip with plaster rings for flush mounting devices in finished walls.

.4 Blank cover plates for boxes without wiring devices.

.5 Equip with centre fixture studs for light fixtures.

.6 Use cast boxes where indicated and for surface mounted wiring. In areas above hung ceilings where appearance is not significant, pressed steel surface boxes may be used.

.7 Supply all outlet boxes and pull boxes sized according to code requirements unless specified otherwise on the drawings.

2.3 SUPPORT HARDWARE

.1 Use 10mm (3/8") threaded rod for suspended unistrut and conduit.

.2 Unless otherwise specified, use 41mm x 41mm (1-5/8" x 1-5/8") galvanized steel unistrut for conduit support systems.

Part 3 Execution

3.1 INSTALLATION

.1 Install outlet boxes as follows:

.1 Support boxes independently of connecting conduits.

.2 Make necessary mounting adjustments to the outlet to match interior finish.

.3 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of construction material.

.4 Where more than one conduit enters a switch or receptacle box on the same side, provide a 100mm (4") minimum square box with a suitable plaster ring.

.5 Location and appearance to be to the NRC Departmental Representative's approval.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative’s approval.

Part 2 Products

2.1 RACEWAYS

.1 Conduit:

.1 Each length of conduit to be new and bear the CSA Stamp of Approval.

.2 Conduit, unless otherwise noted, to be EMT, no smaller than 12mm (1/2").

.3 Conduit to be coloured as required for systems described in section 260500.9.

.2 Bushings and Connectors:

.1 Insulated type, with the insulation an integral part of the fitting.

.3 Conduit Fastening:

.1 One hole malleable iron straps to secure surface conduits. Two hole straps for conduits larger than 50mm (2").

.2 Beam clamps to secure conduits to exposed steel work.

.3 Channel type supports for two or more conduits.

.4 Pull Cord:

.1 Polypropylene cord in empty conduit.

.5 Unless specifically called for on the drawings, do not use flexible conduits but it is recognized that there may be applications where this material will be useful, such as equipment connections, etc. In such cases, obtain permission for its use from the NRC Departmental Representative. For tender purposes, assume that flexible conduits will not be permitted unless specifically called for on the drawings or equipment specifications. All flexible conduits for vapour-tight applications shall be liquid-tight flexible conduits (seal-tight).

.6 Provide expansion couplings for all conduits running in slabs through expansion joints. These shall be the type approved for use in concrete with a bonding conductor.

2.2 SURFACE RACEWAY SYSTEM

.1 As per drawing.

2.3 SUPPORT HARDWARE

.1 Use 10mm (3/8") threaded rod for suspended unistrut and conduit.

.2 Unless otherwise specified, use 41mm x 41mm (1-5/8" x 1-5/8") galvanized steel unistrut channel for conduit and cable support systems, on center spacing at 1.5m.

Part 3 Execution

3.1 RACEWAYS

.1 Install raceways as follows:

.1 Rigidly supported.
.2 Workmanlike manner.
.3 Maintain maximum headroom.
.4 Concealed in finished area.
.5 Surface-mounted in open area.
.6 Do not pass conduits through structural members except as indicated.
.7 Parallel to or at right angles to the building lines.
.8 Thoroughly ream all conduits at ends and terminate with appropriate locknuts and bushings.
.9 Cause minimum interference in spaces through which they pass.
.10 Plug or cap conduit during construction to protect from dust, dirt or water.
.11 Unless specifically indicated on drawings or with the permission of the NRC Departmental Representative, do not cast conduits in concrete.
.12 Dry conduits out before installing wire.
.13 Mechanically bend steel conduit larger than 22 mm (3/4") diameter. Bend conduit cold.
.14 Do not cut or modify prefabricated bends.
.15 PVC conduit as indicated.
.16 Function and appearance to be to the NRC Departmental Representative's approval.
.17 Seal conduit and cable openings in fire- rated walls and floors with an approved fire stop material.
.18 Seal conduit and cable openings in exterior walls with a weatherproof silicone sealant.
.19 Paint exposed conduits and boxes to match existing wall / ceiling.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 00 10 00.

.2 Submit stamped engineered drawings for structures supporting transformers on walls or other structures other than the floor.

.3 Prior to any installation of circuit breakers in either a new or existing installation, Contractor must submit three (3) copies of a certificate of origin, from the manufacturer, duly signed by the factory and the local manufacturer's representative, certifying that all circuit breakers come from this manufacturer, they are new and they meet standards and regulations. These certificates must be submitted to the Departmental Representative for approval.

.1 The above applies to all breakers rated above 240V.

.2 The above applied to all breakers rated up to 240V and 100A or more.

.4 A delay in the production of the certificate of origin won't justify any extension of the contract and additional compensation.

.5 Any work of manufacturing, assembly or installation should begin only after acceptance of the certificate of origin by Departmental Representative. Unless complying with this requirement, Departmental Representative reserves the right to mandate the manufacturer listed on circuit breakers to authenticate all new circuit breakers under the contract at the Contractor's expense.

.6 In general, the certificate of origin must contain:

.1 The name and address of the manufacturer and the person responsible for authentication. The responsible person must sign and date the certificate;

.2 The name and address of the licensed dealer and the person of the distributor responsible for the Contractor's account.

.3 The name and address of the Contractor and the person responsible for the project.

.4 The name and address of the local manufacturer's representative. The local representative must sign and date the certificate.

.5 The name and address of the building where circuit breakers will be installed:

.1 Project title.

.2 End user's reference number.

.3 The list of circuit breakers.

.7

1.2 IDENTIFICATION

.1 Identification as per Section 26 05 00.

Part 2 Products

2.1 DISCONNECT SWITCHES, FUSED AND NON-FUSED

.1 Fusible and non-fusible disconnect switches in EEMAC Enclosure as indicated.

.2 Provision for padlocking in "OFF" switch position.

.3 Mechanical voidable door interlock in "ON" position.

.4 Fuses: size and type as indicated.

.5 Fuseholders in each switch to be suitable without adaptors, for type and size of fuse indicated.

.6 Quick-make, quick-break action.

.7 "ON-OFF" switch position indication on switch enclosure cover.

.8 Standard of acceptance: Square D, Cutler-Hammer, Siemens, ABB.

2.2 GROUNDING

.1 Insulated grounding conductors in accordance with Section 26 05 00.

.2 Compression connectors for grounding to equipment provided with lugs.

2.3 DRY TYPE TRANSFORMER

.1 Type ANN, C802.2.

.2 Single or three phase, KVA rating, input and output voltage as indicated.

.3 Class 220, 150°C temperature rise insulation system.

.4 Copper windings.

.5 Four 2.5% taps, 2-FCAN and 2-FCBN.

.6 EEMAC 1 enclosure with lifting lugs, removable metal front and side panels.

.7 Drip shield.

.8 Standard of acceptance: Hammond or approved equal.

2.4 PANELBOARDS

.1 600 volt panelboards: bus and breakers rated for 25,000 amp r.m.s. symmetrical interrupting capacity or as indicated.

.2 250 volt branch circuit panelboards to have minimum interrupting capacity of 10,000 amp r.m.s. symmetrical.

.3 Panelboards are to have a main breaker that shall be service entranced approved (i.e. barrier to separate main breaker from remainder of panels).

.4 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.

.5 Panelboards: mains, number of circuits, number and size of branch circuit breakers as indicated.

.6 Two keys for each panelboard and all panelboards to be keyed alike.

.7 Copper bus, neutral and ground bar with neutral of same ampere rating as mains.

.8 Suitable for: plug-in breaker on width over 20", bolt-on breakers on 20" width and less.

.9 Trim and door finish: baked grey enamel.

.10 Drip shield.

.11 Complete circuit directory with typewritten legend showing description of each circuit.

.12 Manufacturer: Square D or approved equal.

2.5 MOULDED CASE CIRCUIT BREAKER

.1 Thermal-magnetic moulded case circuit breakers, quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.

.2 Common-trip breakers with single handle for multiple applications.

.3 All new 120V to 600V circuit breakers installed on this project are to include the handle accessory, "Handle Padlock Attachment", which locks breakers on or off.

.4 Magnetic instantaneous trip elements in circuit breakers, to operate only when the value of current reaches 10 times their setting.

.5 Circuit breaker and panel to be of same manufacturer.

.6 Circuit breakers minimum rating: 10K for 120/240V and 25K for 600/347V or greater if indicated.

.7 Standard of acceptance: Square D or approved equal.

2.6 FUSES

.1 250V and 600V time delay, rejection style, HRC-I, Class RK5.

.2 Standard of acceptance: Gould-Shawmut or approved equal.

Part 3 Execution

3.1 DISCONNECT SWITCHES

.1 Install disconnect switches complete with fuses as indicated.

3.2 GROUNDING

.1 Install complete permanent, continuous, system and circuit, equipment, grounding systems including, conductors, compression connectors, accessories, as indicated, to conform to requirements of Engineer, and local authority having jurisdiction over installation. Where EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Protect exposed grounding conductors from mechanical injury.

.4 Soldered joints not permitted.

3.3 DRY TYPE TRANSFORMER

.1 Transformers above 75 kVA mount on floor.

.2 Provide adequate clearance around transformer for ventilation.

.3 Install transformers in level upright position.

.4 Remove shipping supports only after transformer is installed and just before putting into service.

.5 Loosen isolation pad bolts until no compression is visible.

.6 Make primary and secondary connections shown on wiring diagram.

.7 Energize transformers immediately after installation is completed, where practicable.

.8 Provide equipment identification in accordance with Section 26 05 00.

.9 Connect transformer through side of housing.

3.4 PANELBOARDS

.1 Locate panelboards as indicated and mount securely, plumb, and square, to adjoining surfaces.

.2 Mount panels to height specified in section 26 27 26 or as indicated.

.3 Connect loads to circuits as indicated.

.4 Connect neutral conductors to common neutral bus.

3.5 MOULDED CASE CIRCUIT BREAKERS

.1 Install circuit breakers as indicated.

3.6 FUSES

.1 Install fuses in mounting devices immediately before energizing circuit.

.2 Install fuses correctly sized to assigned electrical circuits.

.3 Provide 3 spare fuses for each rating supplied.

END OF SECTION

Part 1 General

1.1 RELATED WORK

.1 Motors and controls to Sections 26 22 19, 26 29 03 & 26 29 10.

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 00 10 00.

1.4 IDENTIFICATION

.1 Identification as per Section 26 05 00.

Part 2 Products

2.1 WIRING DEVICES

.1 Switches:

.1 Specification grade, shallow body, designed to withstand high inductive fluorescent loads CSA C22.2 No. 55.

.2 Number of poles as indicated.

.3 Captive mounting screws, quiet safe mechanical action with rust-proofed mounting strap and silver alloy contact points.

.4 Toggle actuated, colour white unless otherwise indicated.

.5 Brass screw terminals rated 20 AMP at 125 volt.

.6 Standard of acceptance: Hubbell, Leviton.

.2 LED Dimming Switches:

.1 0-10VDC, electronic, suitable for use with installed light fixture.

.2 Rated for 1200W.

.3 Suitable for use in “3-way” configuration where indicated.

.4 Standard of acceptance:

.1 Philips SR1200ZTUNV or equivalent approved by NRC Departmental Representative.

.2 3-way style to be Philips SR3W or equivalent approved by NRC Departmental Representative.

.3 Receptacles:

.1 Duplex type, CSA type 5-15R, 125 volt, 15A, U ground, specification grade with the following features:

.1 Flush type with parallel blade slots.

.2 Double-wiping contacts.

.3 Double-grounding terminals.

.4 Break-off feature for separate feeds.

.5 One piece body, colour white unless otherwise indicated.

.2 Special receptacles with ampacity and voltage as indicated.

.3 Receptacles of one manufacturer throughout the project.

.4 Cover Plates:

.1 Cover plates for wiring devices.

.2 Smooth white plastic for wiring devices mounted in flush-mounted outlet box.

.3 Sheet metal cover plates for wiring devices mounted in surface-mounted outlet box.

.4 Weatherproof covers to be die cast aluminum. Standard of acceptance: Hubbell WPFS26.

.5 Multi-outlet covers as indicated.

.5 Splitters, Junction Boxes & Cabinets:

.1 Sheet metal enclosure, welded corners and formed cover, provided as required.

Part 3 Execution

3.1 LOCATION OF OUTLETS

.1 The number and general location of outlets for lighting, power, telephones, etc., are to be as shown on the drawings. Install all outlets accurately and uniformly with respect to building details. When centering outlets, make allowance for overhead pipes, ducts, etc. and for variations in wall or ceiling finish, window trim, etc. Reinstall incorrectly installed outlets at no cost to the Owner. Make field power and control connections as indicated.

.2 The location of all outlets as shown on the plans are approximate and are subject to change, up to 3m (10') without extra cost or credit provided the information is given prior to the installation of the outlet.

.3 Unless otherwise specified, locate light switches on latch side of doors. Determine the direction of all door swings from the architectural drawings or on site, not from the electrical drawings.

3.2 MOUNTING HEIGHTS

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

.2 If mounting height of equipment is not indicated verify before proceeding with installation.

.3 Generally, locate outlets as follows: (except those otherwise shown on the drawings):

.1 Local switches 1.2m (3'-11") to centreline.
.2 Wall receptacles 400mm (1'-4") to centreline.
.3 Clock receptacles 2.4m (8'-0") to centreline.
.4 Lighting panels 1.8m (6'-0") to top.
.5 Telephone and data communications outlet 400mm (1'-4") to centreline.
.6 Fan coil speed control switch 1.2m (3'-11") to centreline.

3.3 WIRING DEVICES

.1 Install wiring devices as follows:

.1 Where more than one local device is shown at one location, they are to be set under one cover plate.
.2 Install single throw switches with handle in "up" position when switch closed.
.3 Devices in gang type outlet box when more than one device is required in one location.
.4 Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
.5 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
.6 Install metal barriers where required.
.7 Remove insulation carefully from ends of conductors and connect wiring as required.
.8 Bond and ground as required.

3.4 SPLITTERS AND DEVICES

.1 Installation of splitters, junction boxes, pull boxes & cabinets as follows:

.1 Mount plumb, true and square to the building lines.
.2 Install in inconspicuous but accessible locations.
.3 Install pull boxes so as not to exceed 30 m (100') of conduit run between boxes or as indicated.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative's approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 001000.

.2 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by NRC Departmental Representative.

Part 2 Products

2.1 FINISHES

.1 Baked enamel finish.

.1 Metal surfaces of luminaire housing and reflectors finished with high gloss powder coated baked enamel applied after fabrication to give smooth uniform appearance, free from pinholes or defects.

2.2 METAL SURFACES

.1 Metal surfaces to be minimum 20 gauge steel.

2.3 LIGHT CONTROL DEVICES

.1 All luminaire lenses to be injection moulded clear virgin acrylic unless otherwise noted.

2.4 LUMINAIRES

.1 LED, as per drawing.

Part 3 Execution

3.1 INSTALLATION

.1 Supply and install all lighting fixtures complete with lamps, switches, supports, etc., to provide a complete working lighting system.

.2 Locate and install luminaires as indicated.

3.2 LUMINAIRE SUPPORTS

.1 For suspended ceiling installations support each luminaire, including exit lights and pot lights, independently of the ceiling support system with separate chains at each end. No. 80 steel sash chain minimum.

.2 Suspended strip light to be support by unistrut at specified height

3.3 WIRING

.1 Connect luminaires to lighting circuits directly for exit fixtures and exterior floodlights.

3.4 LUMINAIRE ALIGNMENT

.1 Align luminaires mounted in continuous rows to form a straight uninterrupted line.

.2 Align luminaires mounted individually parallel or perpendicular to building grid lines as shown on drawing.

3.5 EXTERIOR FLOODLIGHTS

.1 Install floodlights in accordance with manufacturer's instructions and as indicated.

.2 Aim energized floodlights as indicated during darkness and in the presence of the NRC Departmental Representative.

3.6 PHOTOELECTRIC LIGHTING CONTROL

.1 Install photoelectric controls in accordance with manufacturer's instructions.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative’s approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 00 10 00.

Part 2 Products

2.1 EXIT LIGHTS

.1 As per drawing

Part 3 Execution

3.1 EXIT LUMINAIRES

.1 Connect fixtures to emergency power circuits as indicated.

.2 Ensure that the exit light circuit breaker is locked in the "ON" position.

END OF SECTION

Part 1 General

1.1 RELATED WORK SPECIFIED ELSEWHERE

.1 Common Work Results - Electrical Section 26 05 00

1.2 MATERIALS

.1 Provide only new equipment and materials, without blemish or defect, bearing Canadian Standards Association or Authorized Electrical Inspection Department labels, and subject to the approval of the NRC Departmental Representative.

.2 After a contract is awarded, utilize alternative methods and/or materials only after receiving the NRC Departmental Representative’s approval.

1.3 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Section 00 10 00.

1.4 SCOPE OF WORK

.1 Supply and install all required material, equipment and labour to provide the fire alarm changes and additions as shown on the drawings and indicated by this section of the specification.

1.5 CONTRACTOR QULIFICATION

.1 The contractor must ensure the supervisor, site foreman and electrician working on site hold valid fire alarm certificate.

1.6 REFERENCES

.1 Government of Canada

.1 TB OSH Chapter 3-03, [latest edition], Treasury Board of Canada, Occupational Safety and Health, Chapter 3-03, Standard for Fire protection Electronic Data Processing Equipment.

.2 TB OSH Chapter 3-04, [latest edition], Treasury Board of Canada, Occupational Safety and Health, Chapter 3-04, Standard for Fire Alarm Systems.

.2 Treasury Board: Fire Protection Standard effective April 1, 2010

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.4 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S524-[latest edition], Standard for the Installation of Fire Alarm Systems.

.2 CAN/ULC-S525-[latest edition], Audible Signal Device for Fire Alarm Systems.

.3 CAN/ULC-S526-[latest edition], Visual Signal Devices for Fire Alarm Systems.

.4 CAN/ULC-S527-[latest edition], Control Units.

.5 CAN/ULC-S528-[latest edition], Manual Pull Stations for Fire Alarm Systems.

.6 CAN/ULC-S529-[latest edition], Smoke Detectors for Fire Alarm Systems.

.7 CAN/ULC-S530-[latest edition], Heat Actuated Fire Detectors for Fire Alarm Systems.

.8 CAN/ULC-S531-[latest edition], Standard for Smoke Alarms.

.9 CAN/ULC-S536-S537-[latest edition], Burglar and Fire Alarm Systems and Components.

.5 National Fire Protection Agency

.1 NFPA 72-[latest edition], National Fire Alarm Code.

.2 NFPA 90A-[latest edition], Installation of Air Conditioning and Ventilating Systems.

Part 2 Products

2.1 AUTOMATIC ALARM INITIATING DEVICES

.1 Intelligent heat detector. Rate-of-rise rated at 8.3°C (15°F)/min. Optional carbon monoxide sensor. Automatic device mapping, self-diagnostic. Stand-alone operation. Edwards model No. SIGA2-HRS.

.2 Intelligent photoelectric smoke detector. Self-diagnostics and history mapping. Automatic device mapping. Stand-alone operation. Edwards model No. SIGA2-PS.

.3 Intelligent duct smoke detector. Can be installed in ducts up to 10ft. remote LED and test station accessories. Edwards model No. SIGA-DH.

.4

2.2 MANUAL ALARM STATIONS

.1 Pull lever, breakglass, wall mounted, red, bilingual and with electronic addressing. Edwards model No. SIGC-270B.

2.3 AUDIBLE, VISUAL DEVICES

.1 Combination horn/strobe device:

.1 Fire alarm Horn/strobe combination device, red in colour.

.2 Adjustable cd output of 15, 20, 75 & 110. Selectable hi/low dB output.

.3 Red with red trim ring.

.4 Include Synchronization module to synchronize strobes.

.5 Standard of acceptance: Chubb Edwards G1R-HDVM.

.2 Visual Device:

.1 Fire alarm strobe only, red in colour.

.2 Adjustable cd output of 15, 20, 75 & 110.

.3 Red with red trim ring.

.4 Include Synchronization module to synchronize strobes.

.5 Standard of acceptance: Chubb Edwards G1R-VM.

2.4 CONDUIT AND WIRING

.1 Raceway to be 16mm EMT unless indicated otherwise on the drawings. Wiring between junction box on underside of slab and heat detector junction box in T-bar ceiling to be 21mm flexible conduit.

.2 All wiring is to be colour coded to match existing system and is to be of stranded copper.

.3 Zone wiring is to be #16 TEW colour coded stranded copper.

.4 Signal wiring to be sized to take into account voltage drop and is not to be smaller than #12 TW colour coded stranded copper.

Part 3 Execution

3.1 MOUNTING OF EQUIPMENT

.1 Recess mount equipment in all areas except where specified in unfinished areas.

.1 Fire alarm stations 1.2m (3'-11") to centreline.

.2 Fire alarm bells 2.1m (7'-0") to centreline.

.2 Mounting heights from floor level to centerline of equipment are as follows:

.1 Fire alarm stations 1.2m (3'-11") to centreline.

.2 Fire alarm bells, horns, strobes 2.1m (7'-0") to centreline.

3.2 CONDUIT AND WIRING

.1 All fire alarm initiating device circuits wiring to be class "A" using #18 minimum FAS-105 red jacketed twisted shielded pairs cable, and in accordance with manufacturer’s requirements. Run each pair of wire in separate conduit to make it true class ‘A’.

.2 All Bell signal circuit wiring to be class "A" using 4#16 TW (or larger) colour coded stranded copper wires.

.3 All conduit to include a #16 TW stranded copper green ground wire.

.4 Use only uninsulated ring-type STA-KON lugs on screw connections.

.5 Run conduit tight along underside of ceiling slab or roof deck, unless noted otherwise on drawings.

.6 In rooms having false ceilings, each fire detection device is to have one junction box secured to the underside of the ceiling slab or roof deck and another firmly supported to the false ceiling tile. The junction box connected to the fire alarm device is not to be used as a raceway for connection to other devices. All splices and routing to other fire alarm devices is to be from the junction box mounted on the underside of the ceiling slab or roof deck.

.7 Use Tee bar electrical box hangers (Caddy #51224 for 610mm T-bar spacing) to mount heat detectors on T-bar ceiling tiles.

.8 Install a maximum of 1.5 m (5'-0") 3/4" (21mm) flexible conduit where a heat detector is installed on T-bar ceiling tiles. This is to allow the ceiling tile, having the device, to be shifted two feet either direction for access above the ceiling.

.9 Leave 6 inch loops of wire in all junction boxes.

.10 For new installations, no splicing of wires is to be made.

.11 For renovations, splices may be made in junction boxes other than those at heat detectors after receiving approval of the NRC Departmental Representative. All splices must be soldered and taped.

.12 Upon awarding of the contract, the NRC Departmental Representative shall provide the contractor with the standard wiring diagram for detection devices, A-7481.

.13 Prior to installing raceways, submit to the NRC Departmental Representative a proposed method and layout of conduit for approval.

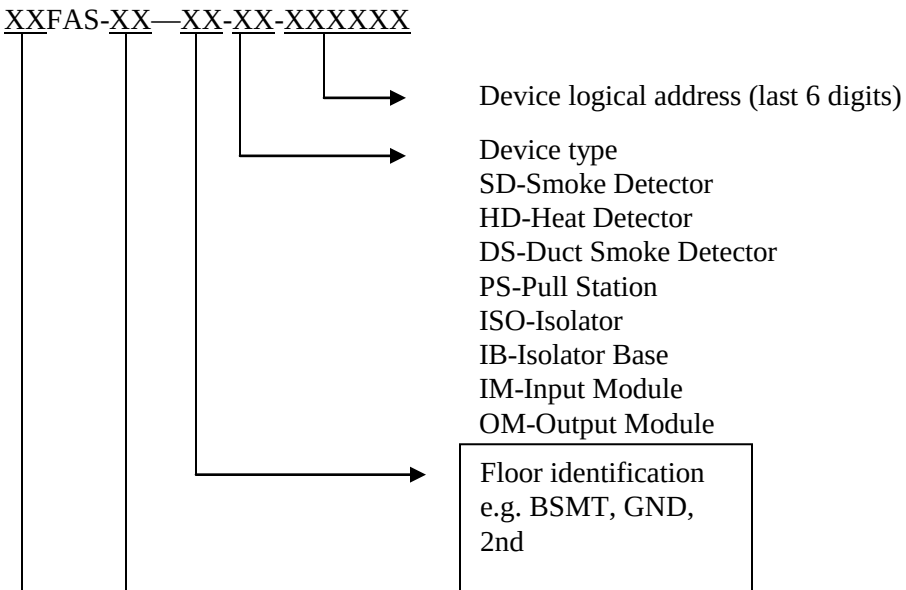
3.3 EQUIPMENT IDENTIFICATION

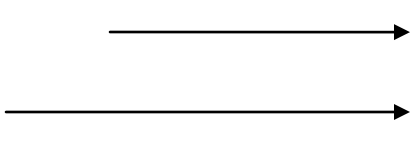
.1 Label each manual alarm station and each audible signal device with its unique identification number as per drawings. Use lamicoid nameplates as per Section 26 05 00.

.2 Label each initiating device use P-Touch type as per Section 26 05 00. Devices are to be numbered per the format shown below.

Example M-10 fire alarm #1 Heat detector 000001

10FAS-01-GND-HD-000001





.3 Label wires as per drawing and as per Section. 26 05 00.

.4 Update remote annunciator panels and fire alarm panel zone directories if new zones are added to the system.

3.4 SCHEDULING OF SHUTDOWNS

.1 Make written shutdown request to the NRC Departmental Representative at least 48 hours in advance. Acceptance of shutdown request will be determined by the NRC Departmental Representative based on building user needs. Fire alarm systems are to be shut down by NRC staff only. **Contractor is not to shutdown system on their own.**

3.5 INTEGRATION INTO SYSTEM MONITORING AT BUILDING M-1

Presently all NRC buildings in Ottawa report back their fire alarm status to the M1 building central monitoring station. The monitoring station consists of a computer graphics terminal showing building layouts of each building, and is linked on an internal NRC network. The new fire alarm system under this contract must communicate all addressable input points to the existing computer graphics monitoring station, Fireworks by Chubb Edwards. All required modifications to the existing Fireworks station are to be included in this tender.

.1 Addressable devices:

- .1 Integrate any new addressable devices installed as part of this project into the monitoring system at building M-1.
- .2 Remove from the monitoring system at building M-1 any addressable devices removed as part of this project.
- .3 Make appropriate changes to the monitoring system at building M-1 to reflect any relocated addressable devices.
- .4 All work on the monitoring system at building M-1 is to be done by factory trained technician.

.2 Conventional (non-addressable) devices:

- .1 Integrate any new zones installed as part of this project into the monitoring system at building M-1. This is to be done by factory trained technician.
- .2 Remove from the monitoring system at building M-1 any zones removed as part of this project.
- .3 Make appropriate changes to the monitoring system at building M-1 to reflect any zone location changes as appropriate.

.4 All work on the monitoring system at building M-1 is to be done by factory trained technician.

3.6 ACCEPTANCE TEST

.1 Perform tests in accordance with the latest regulations and in the presence of the NRC Departmental Representative and the representative of the regulating authority.

.2 Test each device and alarm circuit to ensure manual alarm stations, thermal and smoke detectors transmit alarms to control panel and actuate alarm.

.3 Check annunciator panels to ensure that the correct zones are activated.

.4 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of trouble signals.

.5 Record amperage drawn by audible signal device circuits if new audible signal devices have been added to the circuit.

.6 Give the NRC Departmental Representative one set of marked in red prints labelled "As Built".

.7 Provide the NRC Departmental Representative with a letter of verification from the manufacturer of the equipment stating that the equipment supplied under this contract has been installed as per the latest CAN/ULC S537 and CAN/ULC-S524 standards and as per the latest edition of the Ontario Building Code.

.8 For new fire alarm systems provide the NRC Departmental Representative with a certificate of verification stating that the equipment has been installed as per the latest CAN/ULC-S537 and CAN/ULC-S524 standards and as per the latest edition of the National Building Code.

END OF SECTION

TP1 Amount Payable – General

1.1 Subject to any other provisions of the contract, Her Majesty shall pay the Contractor, at the times and in the manner hereinafter set out, the amount by which

1.1.1 the aggregate of the amounts described in TP2 exceeds

1.1.2 the aggregate of the amounts described in TP3

and the Contractor shall accept that amount as payment in full satisfaction for everything furnished and done by him in respect of the work to which the payment relates.

TP2 Amounts Payable to the Contractor

2.1 The amounts referred to in TP1.1.1 are the aggregate of

2.1.1 the amounts referred to in the Articles of Agreement, and

2.1.2 the amounts, if any, that are payable to the Contractor pursuant to the General Conditions.

TP3 Amounts Payable to Her Majesty

3.1 The amounts referred to in TP1.1.2 are the aggregate of the amounts, in any, that the Contractor is liable to pay Her Majesty pursuant to the contract.

3.2 When making any payments to the Contractor, the failure of Her Majesty to deduct an amount referred to in TP3.1 from an amount referred to in TP2 shall not be constitute a waiver of the right to do so, or an admission of lack of entitlement to do so in any subsequent payment to the Contractor.

TP4 Time of Payment

4.1 In these Terms of Payment

4.1.1 The "payment period" means a period of 30 consecutive days or such other longer period as is agreed between the Contractor and the Departmental Representative.

4.1.2 An amount is "due and payable" when it is due and payable by Her Majesty to the Contractor according to TP4.4, TP4.7 or TP4.10.

4.1.3 An amount is overdue when it is unpaid on the first day following the day upon which it is due and payable.

4.1.4 The "date of payment" means the date of the negotiable instrument of an amount due and payable by the Receiver General for Canada and given for payment.

4.1.5 The "Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the opening of business on the date of payment.

4.2 The Contractor shall, on the expiration of a payment period, deliver to the Departmental Representative in respect of that payment period a written progress claim that fully describes any part of the work that has been completed, and any material that was delivered to the work site but not incorporated into the work during that payment period.

4.3 The Departmental Representative shall, not later than ten days after receipt by him of a progress claim referred to in TP4.2,

4.3.1 inspect the part of the work and the material described in the progress claim; and

4.3.2 issue a progress report, a copy of which the Departmental Representative will give to the Contractor, that indicates the value of the part of the work and the material described in the progress claim that, in the opinion of the Departmental Representative,

4.3.2.1 is in accordance with the contract, and

4.3.2.2 was not included in any other progress report relating to the contract.

4.4 Subject to TP1 and TP4.5 Her Majesty shall, not later than 30 days after receipt by the Departmental Representative of a progress claim referred to in TP4.2, pay the Contractor

4.4.1 an amount that is equal to 95% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has been furnished by the Contractor, or

4.4.2 an amount that is equal to 90% of the value that is indicated in the progress report referred to in TP4.3.2 if a labour and material payment bond has not been furnished by the Contractor.

4.5 It is a condition precedent to Her Majesty's obligation under TP4.4 that the Contractor has made and delivered to the Departmental Representative,

4.5.1 a statutory declaration described in TP4.6 in respect of a progress claim referred to in TP4.2,

4.5.2 in the case of the Contractor's first progress claim, a construction schedule in accordance with the relevant sections of the Specifications, and

4.5.3 if the requirement for a schedule is specified, an update of the said schedule at the times identified in the relevant sections of the Specifications.

4.6 A statutory declaration referred to in TP4.5 shall contain a deposition by the Contractor that

4.6.1 up to the date of the Contractor's progress claim, the Contractor has complied with all his lawful obligations with respect to the Labour Conditions; and

4.6.2 up to the date of the Contractor's immediately preceding progress claim, all lawful obligations of the Contractor to subcontractors and suppliers of material in respect of the

work under the contract have been fully discharged.

4.7 Subject to TP1 and TP4.8, Her Majesty shall, not later than 30 days after the date of issue of an Interim Certificate of Completion referred to in GC44.2, pay the Contractor the amount referred to in TP1 less the aggregate of

4.7.1 the sum of all payments that were made pursuant to TP4.4;

4.7.2 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty or rectifying defects described in the Interim Certificate of Completion; and

4.7.3 an amount that is equal to the Departmental Representative's estimate of the cost to Her Majesty of completing the parts of the work described in the Interim Certificate of Completion other than the defects referred to in TP4.7.2.

4.8 It is a condition precedent to Her Majesty's obligation under TP4.7 that the Contractor has made and delivered to the Departmental Representative,

4.8.1 a statutory declaration described in TP4.9 in respect of an Interim Certificate of Completion referred to in GC44.2, and

4.8.2 if so specified in the relevant sections of the Specifications, and update of the construction schedule referred to in TP4.5.2 and the updated schedule shall, in addition to the specified requirements, clearly show a detailed timetable that is acceptable to the Departmental Representative for the completion of any unfinished work and the correction of all defects.

4.9 A statutory declaration referred to in TP4.8 shall contain a deposition by the contractor that up to the date of the Interim Certificate of Completion the Contractor has

4.9.1 complied with all of the Contractor's lawful obligations with respect to the Labour Conditions;

4.9.2 discharged all of the Contractor's lawful obligations to the subcontractors and suppliers of material in respect of the work under the contract; and

4.9.3 discharged the Contractor's lawful obligations referred to in GC14.6.

4.10 Subject to TP1 and TP4.11, Her Majesty shall, not later than 60 days after the date of issue of a Final Certificate of Completion referred to in GC44.1, pay the Contractor the amount referred to in TP1 less the aggregate of

4.10.1 the sum of all payments that were made pursuant to TP4.4; and

4.10.2 the sum of all payments that were made pursuant to TP4.7.

4.11 It is a condition precedent to Her Majesty's obligation under TP4.10 that the Contractor has made and delivered a statutory declaration described in TP4.12 to the Departmental Representative.

4.12 A statutory declaration referred to in TP4.11 shall, in addition to the depositions described in TP4.9, contain a deposition by the Contractor that all of the Contractor's lawful obligations and any lawful claims against the Contractor that arose out of the performance of the contract have been discharged and satisfied.

TP5 Progress Report and Payment Thereunder Not Binding on Her Majesty

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

TP6 Delay in Making Payment

6.1 Nothwithstanding GC7 any delay by Her Majesty in making any payment when it is due pursuant to these Terms of Payment shall not be a breach of the contract by Her Majesty.

6.2 Her Majesty shall pay, without demand from the Contractor, simple interest at the Bank Rate plus 1 -1/4 per centum on any amount which is overdue pursuant to TP4.1.3, and the interest shall apply from and include the day such amount became overdue until the day prior to the date of payment except that

6.2.1 interest shall not be payable or paid unless the amount referred to in TP6.2 has been overdue for more that 15 days following

6.2.1.1 the date the said amount became due and payable, or

6.2.1.2 the receipt by the Departmental Representative of the Statutory Declaration referred to in TP4.5, TP4.8 or TP4.11,

whichever is the later, and

6.6.2 interest shall not be payable or paid on overdue advance payments if any.

TP7 Right of Set-off

7.1 Without limiting any right of set-off or deduction given or implied by law or elsewhere in the contract, Her Majesty may set off any amount payable to Her Majesty by the Contractor under this contract or under any current contract against any amount payable to the Contractor under this contract.

7.2 For the purposes of TP7.1, "current contract" means a contract between Her Majesty and the Contractor

7.2.1 under which the Contractor has an undischarged obligation to perform or supply work, labour or material, or

7.2.2 in respect of which Her Majesty has, since the date of which the Articles of Agreement were made, exercised any right to take the work that is the subject of the contract out of the Contractor's hands.

TP8 Payment in Event of Termination

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

TP9 Interest on Settled Claims

9.1 Her Majesty shall pay to the Contractor simple interest on the amount of a settled claim at an average Bank Rate plus 1 ¼ per centum from the date the settled claim was outstanding until the day prior to the date of payment.

9.2 For the purposes of TP9.1,

9.2.1 a claim is deemed to have been settled when an agreement in writing is signed by the Departmental Representative and the Contractor setting out the amount of the claim to be paid by Her Majesty and the items or work for which the said amount is to be paid.

9.2.2 an "average Bank Rate" means the discount rate of interest set by the Bank of Canada in effect at the end of each calendar month averaged over the period the settled claim was outstanding.

9.2.3 a settled claim is deemed to be outstanding from the day immediately following the date the said claim would have been due and payable under the contract had it not been disputed.

9.3 For the purposes of TP9 a claim means a disputed amount subject to negotiation between Her Majesty and the Contractor under the contract.

GC1 Interpretation

1.1 In the contract

1.1.1 where reference is made to a part of the contract by means of numbers preceded by letters, the reference shall be construed to be a reference to the particular part of the contract that is identified by that combination of letters and numbers and to any other part of the contract referred to therein;

1.1.2 "contract" means the contract document referred to in the Articles of Agreement;

1.1.3 "contract security" means any security given by the Contractor to Her Majesty in accordance with the contract;

1.1.4 "Departmental Representative" means the officer or employee or Her Majesty who is designated pursuant to the Articles of Agreement and includes a person specially authorized by him to perform, on his behalf, any of his functions under the contract and is so designated in writing to the Contractor;

1.1.5 "material" includes all commodities, articles and things required to be furnished by or for the Contractor under the contract for incorporation into the work;

1.1.6 "Minister" includes a person acting for, or if the office is vacant, in place of the Minister and his successors in the office, and his or their lawful deputy and any of his or their representatives appointed for the purposes of the contract;

1.1.7 "person" includes, unless the context otherwise requires, a partnership, proprietorship, firm, joint venture, consortium and a corporation;

1.1.8 "plant" includes all animals, tools, implements, machinery, vehicles, buildings, structures, equipment and commodities, articles and things other than material, that are necessary for the due performance of the contract;

1.1.9 "subcontractor' means a person to whom the Contractor has, subject to GC4, subcontracted the whole or any part of the work;

1.1.10 "superintendant" means the employee of the Contractor who is designated by the Contractor to act pursuant to GC19;

1.1.11 "work includes, subject only to any express stipulation in the contract to the contrary, everything that is necessary to be done, furnished or delivered by the Contractor to perform the contract.

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

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

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

1.4.1 the Plans and Specifications, the Specifications govern;

1.4.2 the Plans, the Plans drawn with the largest scale govern; and

1.4.3 figured dimensions and scaled dimensions, the figured dimensions govern.

GC2 Successors and Assigns

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

GC3 Assignment of Contract

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

GC4 Subcontracting by Contractor

4.1 Subject to this General Condition, the Contractor may subcontract any part of the work.

4.2 The Contractor shall notify the Departmental Representative in writing of his intention to subcontract.

4.3 A notification referred to in GC4.2 shall identify the part of the work, and the subcontractor with whom it is intended to subcontract.

4.4 The Departmental Representative may object to the intended subcontracting by notifying the Contractor in writing within six days of receipt by the Departmental Representative of a notification referred to in GC4.2.

4.5 If the Departmental Representative objects to a subcontracting pursuant to GC4.4, the Contractor shall not enter into the intended subcontract.

4.6 The contractor shall not, without the written consent of the Departmental Representative, change a subcontractor who has been engaged by him in accordance with this General Condition.

4.7 Every subcontract entered into by the Contractor shall adopt all of the terms and conditions of ths contract that are of general application.

4.8 Neither a subcontracting nor the Departmental Representative's consent to a subcontracting by the Contractor shall be construed to relieve the Contractor from any obligation under the contract or to impose any liability upon Her Majesty.

GC5 Amendments

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

GC6 No Implied Obligations

6.1 No implied terms or obligations of any kind by or on behalf of Her Majesty shall arise from anything in the contract and the express covenants and agreements therein contained and made by Her Majesty are the only covenants and agreements upon which any rights against Her Majesty are to be founded.

6.2 The contract supersedes all communications, negotiations and agreements, either written or oral, relating to the work that were made prior to the date of the contract.

GC7 Time of Essence

7.1 Time is of the essence of the contract.

GC8 Indemnification by Contractor

8.1 The Contractor shall indemnify and save Her Majesty harmless from and against all claims, demand, losses, costs, damages, actions, suits, or proceedings by whomever made, brought or prosecuted and in any manner based upon, arising out of, related to, occasioned by or attributable to the activities of the Contractor, his servants, agents, subcontractors and sub-subcontractors in performing the work including an infringement or an alleged infringement of a patent of invention or any other kind of intellectual property.

8.2 For the purpose of GC8.1, "activities" includes any act improperly carried out, any omission to carry out an act and any delay in carrying out an act.

GC9 Indemnification by Her Majesty

9.1 Her Majesty shall, subject to the Crown Liability Act, the Patent Act, and any other law that affects Her Majesty's rights, powers, privileges or obligations, indemnify and save the Contractor harmless from and against all claims, demands, losses, costs, damage, actions, suits or proceedings arising out of his activities under the contract that are directly attributable to

9.1.1 lack of or a defect in Her Majesty's title to the work site whether real or alleged; or

9.1.2 an infringement or an alleged infringement by the Contractor of any patent of invention or any other kind of intellectual property occurring while the Contractor was performing any act for the purposes of the contract employing a model, plan or design or any other thing related to the work that was supplied by Her Majesty to the Contractor.

GC10 Members of House of Commons Not to Benefit

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

GC11 Notices

11.1 Any notice, consent, order, decision, direction or other communication, other than a notice referred to in GC11.4, that may be given to the Contractor pursuant to the contract may be given in any manner.

11.2 Any notice, consent, order, decision, direction or other communication required to be given in writing, to any party pursuant to the contract shall, subject to GC11.4, be deemed to have been effectively given

11.2.1 to the Contractor, if delivered personally to the Contractor or the Contractor's superintendent, or forwarded by mail, telex or facsimile to the Contractor at the address set out in A4.1, or

11.2.2 to Her Majesty, if delivered personally to the Departmental Representative, or forwarded by mail, telex or facsimile to the Departmental Representative at the address set out in A1.2.1.

11.3 Any such notice, consent, order, decision, direction or other communication given in accordance with GC11.2 shall be deemed to have been received by either party

11.3.1 if delivered personally, on the day that it was delivered,

11.3.2 if forwarded by mail, on the earlier of the day it was received and the sixth day after it was mailed, and

11.3.3 if forwarded by telex or facsimile, 24 hours after it was transmitted.

11.4 A notice given under GC38.1.1, GC40 and GC41, if delivered personally, shall be delivered to the Contractor if the Contractor is doing business as sole proprietor or, if the Contractor is a partnership or corporation, to an officer thereof.

GC12 Material, Plant and Real Property Supplied by Her Majesty

12.1 Subject to GC12.2, the Contractor is liable to Her Majesty for any loss of or damage to material, plant or real property that is supplied or placed in the care, custody and control of the Contractor by Her Majesty for use in connection with the contract, whether or not that loss or damage is attributable to causes beyond the Contractor's control.

12.2 The Contractor is not liable to Her Majesty for any loss or damage to material, plant or real property referred to in GC12.1 if that loss or damage results from and is directly attributable to reasonable wear and tear.

12.3 The Contractor shall not use any material, plant or real property referred to in GC12.1 except for

the purpose of performing this contract.

12.4 When the Contractor fails to make good any loss or damage for which he is liable under GC12.1 within a reasonable time after being required to do so by the Departmental Representative, the Departmental Representative may cause the loss or damage to be made good at the Contractor's expense, and the Contractor shall thereupon be liable to Her Majesty for the cost thereof and shall, on demand, pay to Her Majesty an amount equal to that cost.

12.5 The Contractor shall keep such records of all material, plant and real property referred to in GC12.1 as the Departmental Representative from time to time requires and shall satisfy the Departmental Representative, when requested, that such material, plant and real property are at the place and in the condition which they ought to be.

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

13.1 Subject to GC14.7 all material and plant and the interest of the Contractor in all real property, licenses, powers and privileges purchased, used or consumed by the Contractor for the contract shall, after the time of their purchase, use or consumption be the property of Her Majesty for the purposes of the work and they shall continue to be the property of Her Majesty.

13.1.1 in the case of material, until the Departmental Representative indicates that he is satisfied that it will not be required for the work, and

13.1.2 in the case of plant, real property, licenses, powers and privileges, until the Departmental Representative indicates that he is satisfied that the interest vested in Her Majesty therein is no longer required for the purposes of the work.

13.2 Material or plant that is the property of Her Majesty by virtue of GC13.1 shall not be taken away from the work site or used or disposed of except for the purposes of the work without the written consent of the Departmental Representative.

13.3 Her Majesty is not liable for loss of or damage from any cause to the material or plant referred to in GC13.1 and the Contractor is liable for such loss or damage notwithstanding that the material or plant is the property of Her Majesty.

GC14 Permits and Taxes Payable

14.1 The Contractor shall, within 30 days after the date of the contract, tender to a municipal authority an amount equal to all fees and charges that would be lawfully payable to that municipal authority in respect of building permits as if the work were being performed for a person other than Her Majesty.

14.2 Within 10 days of making a tender pursuant to GC14.1, the Contractor shall notify the Departmental Representative of his action and of the amount tendered and whether or not the municipal authority has accepted that amount.

14.3 If the municipal authority does not accept the amount tendered pursuant to GC14.1 the Contractor shall pay that amount to Her Majesty within 6 days after the time stipulated in GC14.2.

14.4 For the purposes of GC14.1 to GC14.3 "municipal authority" means any authority that would have jurisdiction respecting permission to perform the work if the owner were not Her Majesty.

14.5 Notwithstanding the residency of the Contractor, the Contractor shall pay any applicable tax arising from or related to the performance of the work under the contract.

14.6 In accordance with the Statutory Declaration referred to in TP4.9, a Contractor who has neither residence nor place of business in the province in which work under the contract is being performed shall provide Her Majesty with proof of registration with the provincial sales tax authorities in the said province.

14.7 For the purpose of the payment of any applicable tax or the furnishing of security for the payment of any applicable tax arising from or related to the performance of the work under the contract, the Contractor shall, notwithstanding the fact that all material, plant and interest of the Contractor in all real property, licenses, powers and privileges, have become the property of Her Majesty after the time of purchase, be liable, as a user or consumer, for the payment or for the furnishing of security for the payment of any applicable tax payable, at the time of the use or consumption of that material, plant or interest of the Contractor in accordance with the relevant legislation.

GC15 Performance of Work under Direction of Departmental Representative

15.1 The Contractor shall

15.1.1 permit the Departmental Representative to have access to the work and its site at all times during the performance of the contract;

15.1.2 furnish the Departmental Representative with such information respecting the performance of the contract as he may require; and

15.1.3 give the Departmental Representative every possible assistance to enable the Departmental Representative to carry out his duty to see that the work is performed in accordance with the contract and to carry out any other duties and exercise any powers specially imposed or conferred on the Departmental Representative under the contract.

CG16 Cooperation with Other Contractors

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

16.2 If

16.2.1 the sending onto the work or its site of other contractors or workers pursuant to GC16.1 could not have been reasonably foreseen or anticipated by the Contractor when entering into the contract, and

16.2.2 the Contractor incurs, in the opinion of the Departmental Representative, extra expense in complying with GC16.1, and

16.2.3 The Contractor has given the Departmental Representative written notice of his claim for the extra expense referred to in GC16.2.2 within 30 days of the date that the other contractors or workers were sent onto the work or its site,

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

GC17 Examination of Work

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

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

GC18 Clearing of Site

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

18.2 Before the issue of an interim certificate referred to in GC44.2, the Contractor shall remove all the plant and material not required for the performance of the remaining work, and all waste material and other debris, and shall cause the work and its site to be clean and suitable for occupancy by Her Majesty's servants, unless otherwise stipulated in the contract.

18.3 Before the issue of a final certificate referred to in GC44.1, the Contractor, shall remove from the work and its site all of the surplus plant and material and any waste material and other debris.

18.4 The Contractor's obligations described in GC18.1 to GC18.3 do not extend to waste material and other debris caused by Her Majesty's servants or contractors and workers referred to in GC16.1.

GC19 Contractor's Superintendent

19.1 The Contractor shall, forthwith upon the award of the contract, designate a superintendent.

19.2 The Contractor shall forthwith notify the Departmental Representative of the name, address and telephone number of a superintendent designate pursuant to GC19.1.

19.3 A superintendent designated pursuant to GC19.1 shall be in full charge of the operations of the Contractor in the performance of the work and is authorized to accept any notice, consent, order, direction, decision or other communication on behalf of the Contractor that may be given to the superintendent under the contract.

19.4 The Contractor shall, until the work has been completed, keep a competent superintendent at the work site during working hours.

19.5 The Contractor shall, upon the request of the Departmental Representative, remove any superintendent who, in the opinion of the Departmental Representative, is incompetent or has been conducting himself improperly and shall forthwith designate another superintendent who is acceptable to the Departmental Representative.

19.6 Subject to GC19.5, the Contractor shall not substitute a superintendent without the written consent of the Departmental Representative.

19.7 A breach by the Contractor of GC19.6 entitles the Departmental Representative to refuse to issue any certificate referred to in GC44 until the superintendent has returned to the work site or another superintendent who is acceptable to the Departmental Representative has been substituted.

GC20 National Security

20.1 If the Minister is of the opinion that the work is of a class or kind that involves the national security, he may order the Contractor

20.1.1 to provide him with any information concerning persons employed or to be employed by him for purposes of the contract; and

20.1.2 to remove any person from the work and its site if, in the opinion of the Minister, that person may be a risk to the national security.

20.2 The Contractor shall, in all contracts with persons who are to be employed in the performance of the contract, make provision for his performance of any obligation that may be imposed upon him under GC19 to GC21.

20.3 The Contractor shall comply with an order of the Minister under GC20.1

GC21 Unsuitable Workers

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

GC22 Increased or Decreased Costs

22.1 The amount set out in the Articles of Agreement shall not be increased or decreased by reason of any increase or decrease in the cost of the work that is brought about by an increase or decrease in the cost of labour, plant or material or any wage adjustment arising pursuant to the Labour Conditions.

22.2 Notwithstanding GC22.1 and GC35, an amount set out in the Articles of Agreement shall be adjusted in the manner provided in GC22.3, if any change in a tax imposed under the Excise Act, the Excise Tax Act, the Old Age Security Act, the Customs Act, the Customs Tariff or any provincial sales tax legislation imposing a retail sales tax on the purchase of tangible personal property incorporated into Real Property

22.2.1 occurs after the date of the submission by the Contractor of his tender for the contract,

22.2.2 applies to material, and

22.2.3 affects the cost to the Contractor of that material.

22.3 If a change referred to in GC22.2 occurs, the appropriate amount set out in the Articles of Agreement shall be increased or decreased by an amount equal to the amount that is established by an examination of the relevant records of the Contractor referred to in GC51 to be the increase or decrease in the cost incurred that is directly attributable to that change.

22.4 For the purpose of GC22.2, where a tax is changed after the date of submission of the tender but public notice of the change has been given by the Minister of Finance before that date, the change shall be deemed to have occurred before the date of submission of the tender.

GC23 Canadian Labour and Material

23.1 The Contractor shall use Canadian labour and material in the performance of the work to the full extent to which they are procurable, consistent with proper economy and expeditious carrying out of the work.

23.2 Subject to GC23.1, the Contractor shall, in the performance of the work, employ labour from the locality where the work is being performed to the extent to which it is available, and shall use the offices of the Canada Employment Centres for the recruitment of workers wherever practicable.

23.3 Subject to GC23.1 and GC23.2, the Contractor shall, in the performance of the work, employ a reasonable proportion of persons who have been on active service with the armed forces of Canada and have been honourably discharged therefrom.

GC24 Protection of Work and Documents

24.1 The Contractor shall guard or otherwise protect the work and its site, and protect the contract, specifications, plans, drawings, information, material, plant and real property, whether or not they are supplied by Her Majesty to the Contractor, against loss or damage from any cause, and he shall not use, issue, disclose or dispose of them without the written consent of the Minister, except as may be essential for the performance of the work.

24.2 If any document or information given or disclosed to the Contractor is assigned a security rating by the person who gave or disclosed it, the Contractor shall take all measures directed by the Departmental Representative to be taken to ensure the maintenance of the degree of security that is ascribed to that rating.

24.3 The Contractor shall provide all facilities necessary for the purpose of maintaining security, and shall assist any person authorized by the Minister to inspect or to take security measures in respect of the work and its site.

24.4 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure compliance with or to remedy a breach of GC24.1 to GC24.3.

GC25 Public Ceremonies and Signs

25.1 The Contractor shall not permit any public ceremony in connection with the work without the prior consent of the Minister.

25.2 The Contractor shall not erect or permit the erection of any sign or advertising on the work or its site without the prior consent of the Departmental Representative.

GC26 Precautions against Damage, Infringement of Rights, Fire, and Other Hazards

26.1 The Contractor shall, at his own expense, do whatever is necessary to ensure that

26.1.1 no person, property, right, easement or privilege is injured, damaged or infringed by reasons of the Contractor's activities in performing the contract;

26.1.2 pedestrian and other traffic on any public or private road or waterway is not unduly impeded, interrupted or endangered by the performance or existence of the work or plant;

26.1.3 fire hazards in or about the work or its site are eliminated and, subject to any direction that may be given by the Departmental Representative, any fire is promptly extinguished;

26.1.4 the health and safety of all persons employed in the performance of the work is not endangered by the method or means of its performance;

26.1.5 adequate medical services are available to all persons employed on the work or its site at all times during the performance of the work;

26.1.6 adequate sanitation measures are taken in respect of the work and its site; and

26.1.7 all stakes, buoys and marks placed on the work or its site by or under the authority of the Departmental Representative are protected and are not removed, defaced, altered or destroyed.

26.2 The Departmental Representative may direct the Contractor to do such things and to perform such additional work as the Departmental Representative considers reasonable and necessary to ensure

compliance with or to remedy a breach of GC26.1.

26.3 The Contractor shall, at his own expense, comply with a direction of the Departmental Representative made under GC26.2.

GC27 Insurance

27.1 The Contractor shall, at his own expense, obtain and maintain insurance contracts in respect of the work and shall provide evidence thereof to the Departmental Representative in accordance with the requirements of the Insurance Conditions "E".

27.2 The insurance contracts referred to in GC27.1 shall

27.2.1 be in a form, of the nature, in the amounts, for the periods and containing the terms and conditions specified in Insurance Conditions "E", and

27.2.2 provide for the payment of claims under such insurance contracts in accordance with GC28.

GC28 Insurance Proceeds

28.1 In the case of a claim payable under a Builders Risk/Installation (All Risks) insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid directly to Her Majesty, and

28.1.1 the monies so paid shall be held by Her Majesty for the purposes of the contract, or

28.1.2 if Her Majesty elects, shall be retained by Her Majesty, in which event they vest in Her Majesty absolutely.

28.2 In the case of a claim payable under a General Liability insurance contract maintained by the Contractor pursuant to GC27, the proceeds of the claim shall be paid by the insurer directly to the claimant.

28.3 If an election is made pursuant to GC28.1, the Minister may cause an audit to be made of the accounts of the Contractor and of Her Majesty in respect of the part of the work that was lost, damaged or destroyed for the purpose of establishing the difference, if any, between

28.3.1 the aggregate of the amount of the loss or damage suffered or sustained by Her Majesty, including any cost incurred in respect of the clearing and cleaning of the work and its site and any other amount that is payable by the Contractor to Her Majesty under the contract, minus any monies retained pursuant to GC28.12, and

28.3.2 the aggregate of the amounts payable by Her Majesty to the Contractor pursuant to the contract up to the date of the loss or damage.

28.4 A difference that is established pursuant to GC28.3 shall be paid forthwith by the party who is determined by the audit to be the debtor to the party who is determined by the audit to be the

creditor.

28.5 When payment of a deficiency has been made pursuant to GC28.4, all rights and obligations of Her Majesty and the Contractor under the contract shall, with respect only to the part of the work that was the subject of the audit referred to in GC28.3, be deemed to have been expended and discharged.

28.6 If an election is not made pursuant to GC28.1.2 the Contractor shall, subject to GC28.7, clear and clean the work and its site and restore and replace the part of the work that was lost, damaged or destroyed at his own expense as if that part of the work had not yet been performed.

28.7 When the Contractor clears and cleans the work and its site and restores and replaces the work referred to in GC 28.6, Her Majesty shall pay him out of the monies referred to in GC28.1 so far as they will thereunto extend.

28.8 Subject to GC28.7, payment by Her Majesty pursuant to GC28.7 shall be made in accordance with the contract but the amount of each payment shall be 100% of the amount claimed notwithstanding TP4.4.1 and TP4.4.2.

GC29 Contract Security

29.1 The Contractor shall obtain and deliver contract security to the Departmental Representative in accordance with the provisions of the Contract Security Conditions.

29.2 If the whole or a part of the contract security referred to in GC29.1 is in the form of a security deposit, it shall be held and disposed of in accordance with GC43 and GC45.

29.3 If a part of the contract security referred to in GC29.1 is in the form of a labour and material payment bond, the Contractor shall post a copy of that bond on the work site.

GC30 Changes in the Work

30.1 Subject o GC5, the Departmental Representative may, at any time before he issues his Final Certificate of Completion,

30.1.1 order work or material in addition to that provided for in the Plans and Specifications; and

30.1.2 delete or change the dimensions, character, quantity, quality, description, location or position of the whole or any part of the work or material proved for in the Plans and Specifications or in any order made pursuant to GC30.1.1,

if that additional work or material, deletion, or change is, in his opinion, consistent with the general intent of the original contract.

30.2 The Contractor shall perform the work in accordance with such orders, deletions and changes that are made by the Departmental Representative pursuant to GC30.1 from time to time as if they had appeared in and been part of the Plans and Specifications.

30.3 The Departmental Representative shall determine whether or not anything done or omitted by the Contractor pursuant to an order, deletion or change referred to in GC30.1 increased or decreased the cost of the work to the Contractor.

30.4 If the Departmental Representative determines pursuant to GC30.3 that the cost of the work to the Contractor has been increased, Her Majesty shall pay the Contractor the increased cost that the Contractor necessarily incurred for the additional work calculated in accordance with GC49 or GC50.

30.5 If the Departmental Representative determines pursuant to GC303.3 that the cost of the work to the Contractor has been decreased, Her Majesty shall reduce the amount payable to the Contractor under the contract by an amount equal to the decrease in the cost caused by the deletion or change referred to in GC30.1.2 and calculated in accordance with GC49.

30.6 GC30.3 to GC30.5 are applicable only to a contract or a portion of a contract for which a Fixed Price Arrangement is stipulated in the contract.

30.7 An order, deletion or change referred to in GC30.1 shall be in writing, signed by the Departmental Representative and given to the Contractor in accordance with GC11.

GC31 Interpretation of Contract by Departmental Representative

31.1 If, ar any time before the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, any question arises between the parties about whether anything has been done as required by the contract or about what the Contractor is required by the contract to do, and, in particular but without limiting the generality of the foregoing, about

31.1.1 the meaning of anything in the Plans and Specification,

31.1.2 the meaning to be given to the Plans and Specifications in case of any error therein, omission therefrom, or obscurity or discrepancy in their working or intention,

31.1.3 whether or not the quality or quantity of any material or workmanship supplied or proposed to be supplied by the Contractor meets the requirements of the contract,

31.1.4 whether or not the labour, plant or material provided by the Contractor for performing the work and carrying out the contract are adequate to ensure that the work will be performed in accordance with the contract and that the contract will be carried out in accordance with its terms,

31.1.5 what quantity of any kind of work has been completed by the Contractor, or

31.1.6 the timing and scheduling of the various phases of the performance of the work,

the question shall be decided by the Departmental Representative whose decision shall be final and conclusive in respect of the work.

31.2 The Contractor shall perform the work in accordance with any decisions of the Departmental

Representative that are made under GC31.1 and in accordance with any consequential directions given by the Departmental Representative.

GC32 Warranty and Rectification of Defects in Work

32.1 Without restricting any warranty or guarantee implied or imposed by law or contained in the contract documents, the Contractor shall, at his own expense,

32.1.1 rectify and make good any defect or fault that appears in the work or comes to the attention of the Minister with respect to those parts of the work accepted in connection with the Interim Certificate of Completion referred to GC44.2 within 12 months from the date of the Interim Certificate of Completion;

32.1.2 rectify and make good any defect or fault that appears in or comes to the attention of the Minister in connection with those parts of the work described in the Interim Certificate of Completion referred to in GC44.2 within 12 months from the date of the Final Certificate of Completion referred to in GC44.1.

32.2 The Departmental Representative may direct the Contractor to rectify and make good any defect or fault referred to in GC32.1 or covered by any other expressed or implied warranty or guarantee.

32.3 A direction referred to in GC32.2 shall be in writing, may include a stipulation in respect of the time within which a defect or fault is required to be rectified and made good by the Contractor, and shall be given to the Contractor in accordance with GC11.

32.4 The Contractor shall rectify and make good any defect or fault described in a direction given pursuant to GC32.2 within the time stipulated therein.

GC33 Non-Compliance by Contractor

33.1 If the Contractor fails to comply with any decision or direction given by the Departmental Representative pursuant to GC18, GC24, GC26, GC31 or GC32, the Departmental Representative may employ such methods as he deems advisable to do that which the Contractor failed to do.

33.2 The Contractor shall, on demand, pay Her Majesty an amount that is equal to the aggregate of all cost, expenses and damage incurred or sustained by Her Majesty by reason of the Contractor's failure to comply with any decision or direction referred to in GC33.1, including the cost of any methods employed by the Departmental Representative pursuant to GC33.1.

GC34 Protesting Departmental Representative's Decisions

34.1 The Contractor may, within ten days after the communication to him of any decision or direction referred to in GC30.3 or GC33.1, protest that decision or direction.

34.2 A protest referred to in GC34.1 shall be in writing, contain full reasons for the protest, be signed

by the Contractor and be given to Her Majesty by delivery to the Departmental Representative.

34.3 If the Contractor gives a protest pursuant to GC34.2, any compliance by the Contractor with the decision or direction that was protested shall not be construed as an admission by the Contractor of the correctness of that decision or direction, or prevent the Contractor from taking whatever action he considers appropriate in the circumstances.

34.4 The giving of a protest by the Contractor pursuant to GC34.2 shall not relieve him from complying with the decision or direction that is the subject of the protest.

34.5 Subject to GC34.6, the Contractor shall take any action referred to in GC34.3 within three months after the date that a Final Certificate of Completion is issued under GC44.1 and not afterwards.

34.6 The Contractor shall take any action referred to in GC34.3 resulting from a direction under GC32 within three months after the expiry of a warranty or guarantee period and not afterwards.

34.7 Subject to GC34.8, if Her Majesty determines that the Contractor's protest is justified, Her Majesty shall pay the Contractor the cost of the additional labour, plant and material necessarily incurred by the Contractor in carrying out the protested decision or direction.

34.8 Costs referred to in GC34.7 shall be calculated in accordance with GC48 to GC50.

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

35.1 Subject to GC35.2 no payment, other than a payment that is expressly stipulated in the contract, shall be made by Her Majesty to the Contractor for any extra expense or any loss or damage incurred or sustained by the Contractor.

35.2 If the Contractor incurs or sustains any extra expense or any loss or damage that is directly attributable to

35.2.1 a substantial difference between the information relating to soil conditions at the work site that is contained in the Plans and Specifications or other documents supplied to the Contractor for his use in preparing his tender or a reasonable assumption of fact based thereon made by the Contractor, and the actual soil conditions encountered by the Contractor at the work site during the performance of the contract, or

35.2.2 any neglect or delay that occurs after the date of the contract on the part of Her Majesty in providing any information or in doing any act that the contract either expressly requires Her Majesty to do or that would ordinarily be done by an owner in accordance with the usage of the trade,

he shall, within ten days of the date the actual soil conditions described in GC35.2.1 were encountered or the neglect or delay described in GC35.2.2 occurred, give the Departmental Representative written notice of his intention to claim for that extra expense or that loss or damage.

35.3 When the Contractor has given a notice referred to in GC35.2, he shall give the Departmental Representative a written claim for extra expense or loss or damage within 30 days of the date that

a Final Certificate of Completion referred to in GC44.1 is issued and not afterwards.

35.4 A written claim referred to in GC35.3 shall contain a sufficient description of the facts and circumstances of the occurrence that is the subject of the claim to enable the Departmental Representative to determine whether or not the claim is justified and the Contractor shall supply such further and other information for that purpose as the Departmental Representative requires from time to time.

35.5 If the Departmental Representative determines that a claim referred to in GC35.3 is justified, Her Majesty shall make an extra payment to the Contractor in an amount that is calculated in accordance with GC47 to GC50.

35.6 If, in the opinion of the Departmental Representative, an occurrence described in GC35.2.1 results in a savings of expenditure by the Contractor in performing the contract, the amount set out in the Articles of Agreement shall, subject to GC35.7, be reduced by an amount that is equal to the saving.

35.7 The amount of the saving referred to in GC35.6 shall be determined in accordance with GC47 to GC49.

35.8 If the Contractor fails to give a notice referred to in GC35.2 and a claim referred to in GC35.3 within the times stipulated, an extra payment shall not be made to him in respect of the occurrence.

GC36 Extension of Time

36.1 Subject to GC36.2, the Departmental Representative may, on the application of the Contractor made before the day fixed by the Articles of Agreement for completion of the work or before any other date previously fixed under this General Condition, extend the time for its completion by fixing a new date if, in the opinion of the Departmental Representative, causes beyond the control of the Contractor have delayed its completion.

36.2 An application referred to in GC36.1 shall be accompanied by the written consent of the bonding company whose bond forms part of the contract security.

GC37 Assessments and Damages for Late Completion

37.1 For the purposes of this General Condition

37.1.1 the work shall be deemed to be completed on the date that an Interim Certificate of Completion referred to in GC44.2 is issued, and

37.1.2 "period of delay" means the number of days commencing on the day fixed by the Articles of Agreement for completion of the work and ending on the day immediately preceding the day on which the work is completed but does not include any day within a period of extension granted pursuant to GC36.1, and any other day on which, in the opinion of the Departmental Representative, completion of the work was delayed for reasons beyond the control of the Contractor.

37.2 If the Contractor does not complete the work by the day fixed for its completion by the Articles of Agreement but completes it thereafter, the Contractor shall pay Her Majesty an amount equal to the aggregate of

37.2.1 all salaries, wages and travelling expenses incurred by Her Majesty in respect of persons overseeing the performance of the work during the period of delay;

37.2.2 the cost incurred by Her Majesty as a result of the inability to use the completed work for the period of delay; and

37.2.3 all other expenses and damages incurred or sustained by Her Majesty during the period of delay as a result of the work not being completed by the day fixed for its completion.

37.3 The Minister may waive the right of Her Majesty to the whole or any part of the amount payable by the Contractor pursuant to GC37.2 I , in the opinion of the Minister, it is in the public interest to do so.

GC38 Taking the Work Out of the Contractor's Hands

38.1 The Minister may, at his sole discretion, by giving a notice in writing to the Contractor in accordance with GC11, take all or any part of the work out of the Contractor's hands, and may employ such means as he sees fit to have the work completed if the Contractor

38.1.1 Has not, within six days of the Minister or the Departmental Representative giving notice to the Contractor in writing in accordance with GC11, remedied any delay in the commencement or any default in the diligent performance of the work to the satisfaction of the Departmental Representative;

38.1.2 has defaulted in the completion of any part of the work within the time fixed for its completion by the contract;

38.1.3 has become insolvent;

38.1.4 has committed an act of bankruptcy;

38.1.5 has abandoned the work;

38.1.6 has made an assignment of the contract without the consent required by GC3.1; or

38.1.7 has otherwise failed to observe or perform any of the provisions of the contract.

38.2 If the whole or any part of the work is taken out of the Contractor's hands pursuant to GC38.1,

38.2.1 the Contractor's right to any further payment that is due or accruing due under the contract is, subject only to GC38.4, extinguished, and

38.2.2 the Contractor is liable to pay Her Majesty, upon demand, an amount that is equal to the amount of all loss and damage incurred or sustained by Her Majesty in respect of the

Contractor's failure to complete the work.

38.3 If the whole or any part of the work that is taken out of the Contractor's hands pursuant to GC38.1 is completed by Her Majesty, the Departmental Representative shall determine the amount, if any, of the holdback or a progress claim that had accrued and was due prior to the date on which the work was taken out of the Contractor's hands and that is not required for the purposes of having the work performed or of compensating Her Majesty for any other loss or damage incurred or sustained by reason of the Contractor's default.

38.4 Her Majesty may pay the Contractor the amount determined not to be required pursuant to GC38.3.

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

39.1 The taking of the work or any part thereof out of the Contractor's hands pursuant to GC38 does not operate so as to relieve or discharge him from any obligation under the contract or imposed upon him by law except the obligation to complete the performance of that part of the work that was taken out of his hands.

39.2 If the work or any part thereof is taken out of the Contractor's hands pursuant to GC38, all plant and material and the interest of the Contractor is all real property, licenses, powers and privileges acquired, used or provided by the Contractor under the contract shall continue to be the property of Her Majesty without compensation to the Contractor.

39.3 When the Departmental Representative certifies that any plant, material, or any interest of the Contractor referred to in GC39.2 is no longer required for the purposes of the work, or that it is not in the interest of Her Majesty to retain that plant, material or interest, it shall revert to the Contractor.

G40 Suspension of Work by Minister

40.1 The Minister may, when in his opinion it is in the public interest to do so, require the Contractor to suspend performance of the work either for a specified or an unspecified period by giving a notice of suspension in wiring to the Contractor in accordance with GC11.

40.2 When a notice referred to in GC40.1 is received by the Contractor in accordance with GC11, he shall suspend all operations in respect of the work except those that, in the opinion of the Departmental Representative, are necessary for the care and preservation of the work, plant and material.

40.3 The Contractor shall not, during a period of suspension, remove any part of the work, plant or material from its site without the consent of the Departmental Representative.

40.4 If a period of suspension is 30 days or less, the Contractor shall, upon the expiration of that period, resume the performance of the work and he is entitled to be paid the extra cost, calculated in accordance with GC48 to GC50, of any labour, plant and material necessarily incurred by him as a result of the suspension.

40.5 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor agree that the performance of the work will be continued by the Contractor, the Contractor shall resume performance of the work subject to any terms and conditions agreed upon by the Minister and the Contractor.

40.6 If, upon the expiration of a period of suspension of more than 30 days, the Minister and the Contractor do not agree that performance of the work will be continued by the Contractor or upon the terms and conditions under which the Contractor will continue the work, the notice of suspension shall be deemed to be a notice of termination pursuant to GC41.

GC41 Termination of Contract

41.1 The Minister may terminate the contract at any time by giving a notice of termination in writing to the Contractor in accordance with GC11.

41.2 When a notice referred to in GC41.1 is received by the Contractor in accordance with GC11, he shall, subject to any conditions stipulated in the notice, forthwith cease all operations in performance of the contract.

41.3 If the contract is terminated pursuant to GC41.1, Her Majesty shall pay the Contractor, subject to GC41.4, an amount equal to

41.3.1 the cost to the contractor of all labour, plant and material supplied by him under the contract up to the date of termination in respect of a contract or part thereof for which a Unit Price Arrangement is stipulated in the contract, or

41.3.2 the lesser of

41.3.2.1 an amount, calculated in accordance with the Terms and Payment, that would have been payable to the Contractor had he completed the work, and

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

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

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

GC42 Claims Against and Obligations of the Contractor or Subcontractor

42.1 Her Majesty may, in order to discharge lawful obligations of and satisfy claims against the Contractor or a subcontractor arising out of the performance of the contract, pay any amount that is due and payable to the Contractor pursuant to the contract directly to the obligees of and the claimants against the Contractor or the subcontractor but such amount if any, as is paid by Her Majesty, shall not exceed that amount which the Contractor would have been obliged to pay to

such claimant had the provisions of the Provincial or Territorial lien legislation, or, in the Province of Quebec, the law relating to privileges, been applicable to the work. Any such claimant need not comply with the provisions of such legislation setting out the steps by way of notice, registration or otherwise as might have been necessary to preserve or perfect any claim for lien or privilege which claimant might have had;

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

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

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

42.2.3 the consent of the Contractor authorizing a payment.

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

42.3 The Contractor shall, by the execution of his contract, be deemed to have consented to submit to binding arbitration at the request of any claimant those questions that need be answered to establish the entitlement of the claimant to payment pursuant to the provisions of GC42.1 and such arbitration shall have as parties to it any subcontractor to whom the claimant supplied material, performed work or rented equipment should such subcontractor wish to be adjoined and the Crown shall not be a party to such arbitration and, subject to any agreement between the Contractor and the claimant to the contrary, the arbitration shall be conducted in accordance with the Provincial or Territorial legislation governing arbitration applicable in the Province or Territory in which the work is located.

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

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

42.6 The Contractor shall discharge all his lawful obligations and shall satisfy all lawful claims against him arising out of the performance of the work at least as often as the contract requires Her

Majesty to pay the Contractor.

42.7 The Contractor shall, whenever requested to do so by the Departmental Representative, make a statutory declaration deposing to the existence and condition of any obligations and claims referred to in GC42.6.

42.8 GC42.1 shall only apply to claims and obligations

42.8.1 the notification of which has been received by the Departmental Representative in writing before payment is made to the Contractor pursuant to TP4.10 and within 120 days of the date on which the claimant

42.8.1.1 should have been paid in full under the claimant's contract with the Contractor or subcontractor where the claim is for money that was lawfully required to be held back from the claimant; or

42.8.1.2 performed the last of the services, work or labour, or furnished the last of the material pursuant to the claimant's contract with the Contractor or subcontractor where the claim is not for money referred to in GC42.8.1.1, and

42.8.2 the proceedings to determine the right to payment of which, pursuant to GC42.2. shall have commenced within one year from the date that the notice referred to in GC42.8.1 was received by the Departmental Representative, and

the notification required by GC42.8.1 shall set forth the amount claimed to be owing and the person who by contract is primarily liable.

42.9 Her Majesty may, upon receipt of a notice of claim under GC42.8.1, withhold from any amount that is due and payable to the Contractor pursuant to the contract the full amount of the claim or any portion thereof.

42.10 The Departmental Representative shall notify the Contractor in writing of receipt of any claim referred to in GC42.8.1 and of the intention of Her Majesty to withhold funds pursuant to GC42.9 and the Contractor may, at any time thereafter and until payment is made to the claimant, be entitled to post, with Her Majesty, security in a form acceptable to Her Majesty in an amount equal to the value of the claim, the notice of which is received by the Departmental Representative and upon receipt of such security Her Majesty shall release to the Contractor any funds which would be otherwise payable to the Contractor, that were withheld pursuant to the provisions of GC42.9 in respect of the claim of any claimant for whom the security stands.

GC43 Security Deposit – Forfeiture or Return

43.1 If

43.1.1 the work is taken out of the Contractor's hands pursuant to GC38,

43.1.2 the contract is terminated pursuant to GC41, or

43.1.3 the Contractor is in breach of or in default under the contract,

Her Majesty may convert the security deposit, if any, to Her own use.

43.2 If Her Majesty converts the contract security pursuant to GC43.1, the amount realized shall be deemed to be an amount due from Her Majesty to the Contractor under the contract.

43.3 Any balance of an amount referred to in GC43.2 that remains after payment of all losses, damage and claims of Her Majesty and others shall be paid by Her Majesty to the Contractor if, in the opinion of the Departmental Representative, it is not required for the purposes of the contract.

GC44 Departmental Representative's Certificates

44.1 On the date that

44.1.1 the work has been completed, and

44.1.2 the Contractor has complied with the contract and all orders and directions made pursuant thereto,

both to the satisfaction of the Departmental Representative, the Departmental Representative shall issue a Final Certificate of Completion to the Contractor.

44.2 If the Departmental Representative is satisfied that the work is substantially complete he shall, at any time before he issues a certificate referred to in GC44.1, issue an Interim Certificate of Completion to the Contractor, and

44.2.1 for the purposes of GC44.2 the work will be considered to be substantially complete,

44.2.1.1 when the work under the contract or a substantial part thereof is, in the opinion of the Departmental Representative, ready for use by Her Majesty or is being used for the purpose intended; and

44.2.1.2 when the work remaining to be done under the contract is, in the opinion of the Departmental Representative, capable of completion or correction at accost of not more that

44.2.1.2.1 -3% of the first $500,000, and

44.2.1.2.2 -2% of the next $500,000, and

44.2.1.2.3 -1% of the balance

of the value of the contract at the time this cost is calculated.

44.3 For the sole purpose of GC44.2.1.2, where the work or a substantial part thereof is ready for use or is being used for the purposes intended and the remainder of the work or a part thereof cannot be completed by the time specified in A2.1, or as amended pursuant to GC36, for reasons beyond the control of the Contractor or where the Departmental Representative and the Contractor agree not to complete a part of the work within the specified time, the cost of that part of the work

which was either beyond the control of the Contractor to complete or the Departmental Representative and the Contractor have agreed not to complete by the time specified shall be deducted from the value of the contract referred to GC44.2.1.2 and the said cost shall not form part of the cost of the work remaining to be done in determining substantial completion.

44.4 An Interim Certificate of Completion referred to in GC44.2 shall describe the parts of the work not completed to the satisfaction of the Departmental Representative and all things that must be done by the Contractor

44.4.1 before a Final Certificate of Completion referred to in GC44.1 will be issued, and

44.4.2 before the 12-month period referred to in GC32.1.2 shall commence for the said parts and all the said things.

44.5 The Departmental Representative may, in addition to the parts of the work described in an Interim Certificate of Completion referred to in GC44.2, require the Contractor to rectify any other parts of the work not completed to his satisfaction and to do any other things that are necessary for the satisfactory completion of the work.

44.6 If the contract or a part thereof is subject to a Unit Price Arrangement, the Departmental Representative shall measure and record the quantities of labour, plant and material, performed, used and supplied by the Contractor in performing the work and shall, at the request of the Contractor, inform him of those measurements.

44.7 The Contractor shall assist and co-operate with the Departmental Representative in the performance of his duties referred to in GC44.6 and shall be entitled to inspect any record made by the Departmental Representative pursuant to GC44.6.

44.8 After the Departmental Representative has issued a Final Certificate of Completion referred to in GC44.1, he shall, if GC44.6 applies, issue a Final Certificate of Measurement.

44.9 A Final Certificate of Measurement referred to in GC44.8 shall

44.9.1 contain the aggregate of all measurements of quantities referred to in GC44.6, and

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

GC45 Return of Security Deposit

45.1 After an Interim Certificate of Completion referred to in GC44.2 has been issued, Her Majesty shall, if the Contractor is not in breach of or in default under the contract, return to the Contractor all or any part of the security deposit that, in the opinion of the Departmental Representative, is not required for the purposes of the contract.

45.2 After a Final Certificate of Completion referred to in GC44.1 has been issued, Her Majesty shall return to the Contractor the remainder of any security deposit unless the contract stipulates otherwise.

45.3 If the security deposit was paid into the Consolidated Revenue Fund of Canada, Her Majesty shall pay interest thereon to the Contractor at a rate established from time to time pursuant to section 21(2) of the Financial Administration Act.

GC46 Clarification of Terms in GC47 to GC50

46.1 For the purposes of GC47 to GC50,

46.1.1 "Unit Price Table" means the table set out in the Articles of Agreement, and

46.1.2 "plant" does not include tools customarily provided by a tradesman in practicing his trade.

GC47 Additions or Amendments to Unit Price Table

47.1 Where a Unit Price Arrangement applies to the contract or a part thereof the Departmental Representative and the Contractor may, by an agreement in writing,

47.1.1 add classes of labour or material, and units of measurement, prices per unit and estimated quantities to the Unit Price Table if any labour, plant or material that is to be included in the Final Certificate of Measurement referred to in GC44.8 is not included in any class of labour, plant or material set out in the Unit Price Table; or

47.1.2 subject to GC47.2 and GC47.3, amend a price set out in the Unit Price Table for any class of labour, plant or material included therein if the Final Certificate of Measurement referred to in GC44.8 shows or is expected to show that the total quantity of that class of labour, plant or material actually performed, used or supplied by the Contractor in performing the work is

47.1.2.1 less than 85% of that estimated total quantity, or

47.1.2.2 in excess of 115% of that estimated total quantity.

47.2 In no event shall the total cost of an item set out in the Unit Price Table that has been amended pursuant to GC47.1.2.1 exceed the amount that would have been payable to the Contractor had the estimated total quantity actually been performed, used or supplied.

47.3 An amendment that is made necessary by GC47.1.2.2 shall apply only to the quantities that are in excess of 115%.

47.4 If the Departmental Representative and the Contractor do not agree as contemplated in GC47.1, the Departmental Representative shall determine the class and the unit of measurement of the labour, plant or material and, subject to GC47.2 and GC47.3, the price per unit therefore shall be determined in accordance with GC50.

GC48 Determination of Cost – Unit Price Table

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

GC49 Determination of Cost – Negotiation

49.1 If the method described in GC48 cannot be used because the labour, plant or material is of a kind or class that is not set out in the Unit Price Table, the cost of that labour, plant or material for the purposes of the contract shall be the amount agreed upon from time to time by the Contractor and the Departmental Representative.

49.2 For the purposes of GC49.1, the Contractor shall submit to the Departmental Representative any necessary cost information requested by the Departmental Representative in respect of the labour, plant and material referred to in GC49.1

GC50 Determination of Cost – Failing Negotiation

50.1 If the methods described in GC47, GC48 or GC49 fail for any reason to achieve a determination of the cost of labour, plant and material for the purposes referred to therein, that cost shall be equal to the aggregate of

50.1.1 all reasonable and proper amounts actually expended or legally payable by the Contractor in respect of the labour, plant and material that falls within one of the classes of expenditure described in GC50.2 that are directly attributable to the performance of the contract,

50.1.2 an allowance for profit and all other expenditures or costs, including overhead, general administration cost, financing and interest charges, and every other cost, charge and expenses, but not including those referred to in GC50.1.1 or GC50.1.3 or a class referred to in GC50.2, in an amount that is equal to 10% of the sum of the expenses referred to in GC50.1.1, and

50.1.3 interest on the cost determined under GC50.1.1 and GC50.1.2, which interest shall be calculated in accordance with TP9,

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

50.2 For purposes of GC50.1.1 the classes of expenditure that may be taken into account in determining the cost of labour, plant and material are,

50.2.1 payments to subcontractors;

50.2.2 wages, salaries and travelling expenses of employees of the Contractor while they are actually and properly engaged on the work, other than wages, salaries, bonuses, living

and travelling expenses of personnel of the Contractor generally employed at the head office or at a general office of the Contractor unless they are engaged at the work site with the approval of the Departmental Representative,

50.2.3 assessments payable under any statutory authority relating to workmen's compensation, unemployment insurance, pension plan or holidays with pay;

50.2.4 rent that is paid for plant or an amount equivalent of the said rent if the plant is owned by the Contractor that is necessary for and used in the performance of the work, if the rent of the equivalent amount is reasonable and use of that plant has been approved by the Departmental Representative;

50.2.5 payments for maintaining and operating plant necessary for and used in the performance of the work, and payments for effecting such repairs thereto as, in the opinion of the Departmental Representative, are necessary to the proper performance of the contract other than payments for any repairs to the plant arising out of defects existing before its allocation to the work;

50.2.6 payments for material that is necessary for and incorporated in the work, or that is necessary for and consumed in the performance of the contract;

50.2.7 payments for preparation, delivery, handling, erection, installation, inspection protection and removal of the plant and material necessary for and used in the performance of the contract; and

50.2.8 any other payments made by the Contractor with the approval of the Departmental Representative that are necessary for the performance of the contract.

GC51 Records to be kept by Contractor

51.1 The Contractor shall

51.1.1 maintain full records of his estimated and actual cost of the work together with all tender calls, quotations, contracts, correspondence, invoices, receipts and vouchers relating thereto.

51.1.2 make all records and material referred to in GC5.1.1 available to audit and inspection by the Minister and the Deputy Receiver General for Canada or by persons acting on behalf of either of both of them, when requested;

51.1.3 allow any of the person referred to in GC51.1.2 to make copies of and to take extracts from any of the records and material referred to in GC51.1.1; and

51.1.4 furnish any person referred to in GC51.1.2 with any information he may require from time to time in connection with such records and material.

51.2 The records maintained by the Contractor pursuant to GC51.1.1 shall be kept intact by the Contractor until the expiration of two years after the date that a Final Certificate of Completion referred to in GC44.1 was issued or until the expiration of such other period of time as the

Minister may direct.

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

GC52 Conflict of Interest

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

GC53 Contractor Status

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

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

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

GENERAL CONDITONS

IC 1 Proof of Insurance
IC 2 Risk Management
IC 3 Payment of Deductible
IC 4 Insurance Coverage

GENERAL INSUANCE COVERAGES

GCI 1 Insured
GIC 2 Period of Insurance
GIC 3 Proof of Insurance
GIC 4 Notification

COMMERCIAL GENERAL LIABILITY

CGL 1 Scope of Policy
CGL 2 Coverages/Provisions
CGL 3 Additional Exposures
CGL 4 Insurance Proceeds
CGL 5 Deductible

BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS

BR 1 Scope of Policy
BR 2 Property Insured
BR 3 Insurance Proceeds
BR 4 Amount of Insurance
BR 5 Deductible
BR 6 Subrogation
BR 7 Exclusion Qualifications

INSURER'S CERTIFICATE OF INSURANCE

General Conditions

IC 1 Proof of Insurance
(02/12/03)

Within thirty (30) days after acceptance of the Contractor's tender, the Contractor shall, unless otherwise directed in writing by the Contracting Officer, deposit with the Contracting Officer an Insurer's Certificate of Insurance in the form displayed in this document and, if requested by the Contracting Officer, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the Insurance Coverage Requirements shown hereunder.

IC 2 Risk Management
(01/10/94)

The provisions of the Insurance Coverage Requirements contained hereunder are not intended to cover all of the Contractor's obligations under GC8 of the General Conditions "C" of the contract. Any additional risk management measures or additional insurance coverages the Contractor may deem necessary to fulfill its obligations under GC8 shall be at its own discretion and expense.

IC 3 Payment of Deductible
(01/10/94)

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

IC 4 Insurance Coverage
(02/12/03)

The Contractor has represented that it has in place and effect the appropriate and usual liability insurance coverage as required by these Insurance Conditions and the Contractor has warranted that it shall obtain, in a timely manner and prior to commencement of the Work, the appropriate and usual property insurance coverage as required by these Insurance Conditions and, further, that it shall maintain all required insurance policies in place and effect as required by these Insurance Conditions.

INSURANCE COVERAGE REQUIREMENTS

PART I
GENERAL INSUANCE COVERAGES (GIC)

GCI 1 Insured
(02/12/03)

Each insurance policy shall insure the Contractor, and shall include, as an Additional Named Insured, Her Majesty the Queen in right of Canada, represented by the National Research Council Canada.

GIC 2 Period of Insurance
(02/12/03)

Unless otherwise directed in writing by the Contracting Officer or otherwise stipulated elsewhere in these Insurance Conditions, the policies required hereunder shall be in force and be maintained from the date of the contract award until the day of issue of the Departmental Representative's Final Certificate of Completion.

GIC 3 Proof of Insurance
(01/10/94)

Within twenty five (25) days after acceptance of the Contractor's tender, the Insurer shall, unless otherwise directed by the Contractor, deposit with the Contractor an Insurer's Certificate of Insurance in the form displayed in the document and, if requested, the originals or certified true copies of all contracts of insurance maintained by the Contractor pursuant to the requirements of these Insurance Coverages.

GIC 4 Notification
(01/10/94)

Each Insurance policy shall contain a provision that (30) days prior written notice shall be given by the Insurer to Her Majesty in the event of any material change in or cancellation of coverage. Any such notice received by the Contractor shall be transmitted forthwith to Her Majesty.

PART II
COMMERCIAL GENERAL LIABILITY

CGL 1 Scope of Policy
(01/10/94)

The policy shall be written on a form similar to that known and referred to in the insurance industry as IBC 2100 – Commercial General Liability policy (Occurrence form) and shall provide for limit of liability of not less than $2,000,000 inclusive for Bodily Injury and Property Damage for any one occurrence or series of occurrences arising out of one cause. Legal or defence cost incurred in respect of a claim or claims shall not operate to decrease the limit of liability.

CGL 2 Coverages/Provisions
(01/10/94)

The policy shall include but not necessarily be limited to the following coverages/provisions.

2.1 Liability arising out of or resulting from the ownership, existence, maintenance or use of premises by the Contractor and operations necessary or incidental to the performance of this contract.

2.2 "Broad Form" Property Damage including the loss of use of property.

2.3 Removal or weakening of support of any building or land whether such support be natural or otherwise.

2.4 Elevator liability (including escalators, hoists and similar devices).

2.5 Contractor's Protective Liability

2.6 Contractual and Assumed Liabilities un this contact.

2.7 Completed Operations Liability – The insurance, including all aspects of this Part II of these Insurance Conditions shall continue for a period of at least one (1) year beyond the date of the Departmental Representative's Final Certificate of Completion for the Completed Operations.

2.8 Cross Liability – The Clause shall be written as follows:

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

2.9 Severability of Interests – The Clause shall be written as follows:

Severability of Interests – This policy, subject to the limits of liability stated herein, shall apply separately to each Insured in the same manner and to the same extent as if a separate policy had been issued to each. The inclusion herein of more than one insured shall not increase the limit of the Insurer's liability.

CGL 3 Additional Exposures
(02/12/03)

The policy shall either include or be endorsed to include the following exposures of hazards if the Work is subject thereto:

3.1 Blasting

3.2 Pile driving and calsson work

3.3 Underpinning

3.4 Risks associated with the activities of the Contractor on an active airport

3.5 Radioactive contamination resulting from the use of commercial isotopes

3.6 Damage to the portion of an existing building beyond that directly associated with an addition, renovation or installation contract.

3.7 Marine risks associated with the contraction of piers, wharves and docks.

CGL 4 Insurance Proceeds
(01/10/94)

Insurance Proceeds from this policy are usually payable directly to a Claimant/Third Party.

CGL 5 Deductible
(02/12/03)

This policy shall be issued with a deductible amount of not more than $10,000 per occurrence applying to Property Damage claims only.

PART III
BUILDER'S RISK – INSTALLATION FLOATER – ALL RISKS

BR 1 Scope of Policy
(01/10/94)

The policy shall be written on an "All Risks" basis granting coverages similar to those provided by the forms known and referred to in the insurance industry as "Builder's Risk Comprehensive Form" or "Installation Floater – All Risks".

BR 2 Property Insured
(01/10/94)

The property insured shall include:

2.1 The Work and all property, equipment and materials intended to become part of the finished Work at the site of the project while awaiting, during and after installation, erection or construction including testing.

2.2 Expenses incurred in the removal from the construction site of debris of the property insured, including demolition of damaged property, de-icing and dewatering, occasioned by loss, destruction or damage to such property and in respect of which insurance is provided by this policy.

BR 3 Insurance Proceeds
(01/10/94)

3.1 Insurance proceeds from this policy are payable in accordance with GC28 of the General Conditions "C" of the contract.

3.2 This policy shall provide that the proceeds thereof are payable to Her Majesty or as the Minister may direct.

3.3 The Contractor shall do such things and execute such documents as are necessary to effect payment of the proceeds.

BR 4 Amount of Insurance
(01/10/94)

The amount of insurance shall not be less than the sum of the contract value plus the declared value (if any) set forth in the contract documents of all material and equipment supplied by Her Majesty at the site of the project to be incorporated into and form part of the finished Work.

BR 5 Deductible
(02/12/03)

The Policy shall be issued with a deductible amount of not more than $10,000.

BR 6 Subrogation
(01/10/94)

The following Clause shall be included in the policy:

"All rights of subrogation or transfer of rights are hereby waived against any corporation, firm, individual or other interest, with respect to which, insurance is provided by this policy".

BR 7 Exclusion Qualifications
(01/10/94)

The policy may be subject to the standard exclusions but the following qualifications shall apply:

7.1 Faulty materials, workmanship or design may be excluded only to the extent of the cost of making good thereof and shall not apply to loss or damage resulting therefrom.

7.2 Loss or damage caused by contamination by radioactive material may be excluded except for loss or damage resulting from commercial isotopes used for industrial measurements, inspection, quality control radiographic or photographic use.

7.3 Use and occupancy of the project or any part of section thereof shall be permitted where such use and occupancy is for the purpose for which the project is intended upon completion.

INSURER'S CERTIFICATE OF INSURANCE

(TO BE COMPLETED BY INSURER (NOT BOKER) AND DELIVERD TO NATIONAL RESEARCH COUNCIL CANADA WITH 30 DAYS FOLLOWING ACCEPTANCE OF TENDER)

CONTRACT

DESCRIPTION OF WORK	CONTRACT NUMBER	AWARD DATE
LOCATION		

INSURER

NAME
ADDRESS

BROKER

NAME
ADDRESS

INSURED

NAME OF CONTRACTOR
ADDRESS

ADDITIONAL INSURED

HER MAJESTY THE QUEEN IN RIGHT OF CANADA AS REPRESENTED BY THE NATIONAL RESEARCH COUNCIL CANADA

THIS DOCUENT CERTIFIES THAT THE FOLLOWING POLICES OF INSURANCE ARE AT PRESENT IN FORCE COVERING ALL OPERATIONS OF THE INSURE IN CONNECTION WITH THE CONTRACT MADE BETWEEN THE NAMED INSURED AND THE NATIONAL RESEARCH COUNCIL CANADA AND IN ACCORDANCE WITH THE INSURANCE CONDITIONS "E"

POLICY					
TYPE	NUMBER	INCEPTION DATE	EXPIRY DATE	LIMITS OF LIABILITY	DEDUCTIBLE
COMMERCIAL GENERAL LIABILITY					
BUILDERS RISK "AL RISKS"					
INSTALLATION FLOATER "ALL RISKS"					

THE INSURER AGREES TO NOTIFY THE NATIONAL RESEARCH COUNCIL CANADA IN WRITING 30 DAYS PRIOR TO ANY MATERIAL CHANGE IN OR CANCELLATION OF ANY POLICY OR COVERAGE SPECIFICALLY RELATED TO THE CONTRACT

NAME OF INSURER'S OFFICER OR AUTHORIZED EMPLOYEE	SIGNATURE	DATE:
		TELEPHONE NUMBER:

ISSUANCE OF THIS CERTIFIATE SHALL NOT LIMIT OR RESTRICT THE RIGHT OF THE NATIONAL RESEARCH COUNCIL CANADA TO REQUEST AT ANY TIME DUPLICATE COPIES OF SAID INSURANCE POLICIES

CS1 Obligation to provide Contract Security

1.1 The Contractor shall, at the Contractor's own expense, provide one or more of the forms of contract security prescribed in CS2.

1.2 The Contractor shall deliver to the Departmental Representative the contract security referred to in CS1.1 within 14 days after the date that the Contractor receives notice that the Contractor's tender or offer was accepted by Her Majesty.

CS2 Prescribed Types and Amounts of Contract Security

2.1 The Contractor shall deliver to the Departmental Representative pursuant to CS1

2.1.1 a performance bond and a labour and material payment bond each in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, or

2.1.2 a labour and material payment bond in an amount that is equal to not less than 50% of the contract amount referred to in the Articles of Agreement, and a security deposit in an amount that is equal to

2.1.2.1 not less than 10% of the contract amount referred to in the Articles of Agreement where that amount does not exceed $250,000, or

2.1.2.2 $25,000 plus 5% of the part of the contract amount referred to in the Articles of Agreement that exceeds $250,000, or

2.1.3 a security deposit in an amount prescribed by CS2.12 plus an additional amount that is equal to 10% of the contract amount referred to in the Articles of Agreement.

2.2 A performance bond and a labour and material payment bond referred to in CS2.1 shall be in a form and be issued by a bonding or surety company that is approved by Her Majesty.

2.3 The amount of a security deposit referred to in CS2.1.2 shall not exceed $250,000 regardless of the contract amount referred to in the Articles of Agreement.

2.4 A security deposit referred to in CS2.1.2 and CS2.1.3 shall be in the form of

2.4.1 a bill of exchange made payable to the Receiver General of Canada and certified by an approved financial institution or drawn by an approved financial institution on itself, or

2.4.2 bonds of or unconditionally guaranteed as to principal and interest by the Government of Canada.

2.5 For the purposes of CS2.4

2.5.1 a bill of exchange is an unconditional order in writing signed by the Contractor and addressed to an approved financial institution, requiring the said institution to pay, on demand, at a fixed or determinable future time a sum certain of money to, or to the order

of, the Receiver General for Canada, and

2.5.2 If a bill of exchange is certified by a financial institution other than a chartered bank then it must be accompanied by a letter or stamped certification confirming that the financial institution is in a t least one of the categories referred to in CS2.5.3

2.5.3 an approved financial institution is

2.5.3.1 any corporation or institution that is a member of the Canadian Payments Association,

2.5.3.2 a corporation that accepts deposits that are insured by the Canada Deposit Insurance Corporation or the Régie de l'assurance-dépôts du Québec to the maximum permitted by law,

2.5.3.3 a credit union as defined in paragraph 137(6)(b) of the *Income Tax Act*,

2.5.3.4 a corporation that accepts deposits from the public, if repayment of the deposit is guaranteed by Her Majesty in right of a province, or

2.5.3.5 The Canada Post Corporation.

2.5.4 the bonds referred to in CS2.4.2 shall be

2.5.4.1 made payable to bearer, or

2.5.4.2 accompanied by a duly executed instrument of transfer of the bonds to the Receiver General for Canada in the form prescribed by the Domestic Bonds of Canada Regulations, or

2.5.4.3 registered, as to principal or as to principal and interest in the name of the Receiver General for Canada pursuant to the Domestic Bonds of Canada Regulations, and

2.5.4.4 provided on the basis of their market value current at the date of the contract.

Government of Canada / Gouvernement du Canada

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

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
National Research Council	ASPM/SAGI

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
Renovate south wing, ground floor of M-58

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 : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : Specify country(ies): / Préciser le(s) pays : ☐	Restricted to: / Limité à : 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?
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 :
☒ No / Non ☐ Yes / Oui

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

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

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

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

☒ 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 : _____

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

10. b) May unscreened personnel be used for portions of the work?
Du personnel sans autorisation sécuritaire peut-il se voir confier des parties du travail?
☒ No / Non ☐ Yes / Oui

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

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

INFORMATION / ASSETS / RENSEIGNEMENTS / BIENS

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

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

PRODUCTION

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

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

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

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

Government of Canada / Gouvernement du Canada

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

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

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

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

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category / Catégorie	PROTECTED / PROTÉGÉ			CLASSIFIED / CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET	NATO RESTRICTED / NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL / NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET / COSMIC TRÈS SECRET	PROTECTED / PROTÉGÉ A	PROTECTED / PROTÉGÉ B	PROTECTED / PROTÉGÉ 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
Derek Foot	Construction Project Manager	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
613-991-4451		derek.foot@nrc.ca	December 7, 2015

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées)	Title – Titre	Signature
Charlotte Carrier	***Controlled Goods and Contracts Security Coordinator***	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
(613) 993-8956	(613) 990-0946	Charlotte.Carrier@nrc-cnrc.gc.ca	8 Dec 2015

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
MARC BEDARD	Senior Contracts Officer	

Telephone No. - N° de téléphone	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date
613 993-2274			22/12/15

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