



DEVIS

NO. DE SOLICITATION: 17-22098

Edifice: M-19
1200 chemin Montréal,
Ottawa, Ontario

PROJET: M-19, Amalgamation des magasins, Phase I

NO. DE PROJET : M19-5463

Date: novembre 2017

DEVIS

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Directions to the Ottawa Research Facilities – Montreal Road

1200 Montréal Road
Ottawa, Ontario, Canada K1A 0R6

Tel: 613-993-9101

NRC Institutes/Branch/Program	Buildings
Information/Security	M-1
NRC Administrative Services and Property Management (NRC-ASPM)	M-5, M-6, M-15, M-16, M-18A, M-19, M-22, M-26, M-39, M-40A, M-53
NRC Canada Institute for Scientific and Technical Information (NRC-CISTI)	M-50, M-55
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NRC Design and Fabrication Services (DFS)	M-2, M-4, M-10, M-36
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NRC Institute For Chemical Process and Environmental Technology (NRC-ICPET)	M-8, M-9, M-10, M-12, M-45
NRC Institute For Information Technology (NRC-IIT)	M-2, M-50
NRC Institute For Microstructural Sciences (NRC-IMS)	M-36, M-37, M-50
NRC Institute For National Measurements Standards (NRC-INMS)	M-35, M-36, M-51
NRC Institute For Research In Construction (NRC-IRC)	M-20, M-24, M-25, M-27, M-42, M-48, M-59
NRC Strategy and Development Branch (NRC-SDB)	M-58

By Road, from the OTTAWA International Airport

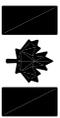
1. From the airport take the AIRPORT PARKWAY to RIVERSIDE DR EAST
2. Follow RIVERSIDE DR EAST to HIGHWAY 417 EAST
3. Take HIGHWAY 417 EAST, past the ST-LAURENT BLVD exit, where HIGHWAY 417 splits, continue LEFT on HIGHWAY 174 (ROCKLAND)
4. Exit HIGHWAY 174 on BLAIR RD NORTH
5. Proceed on BLAIR RD NORTH, 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.

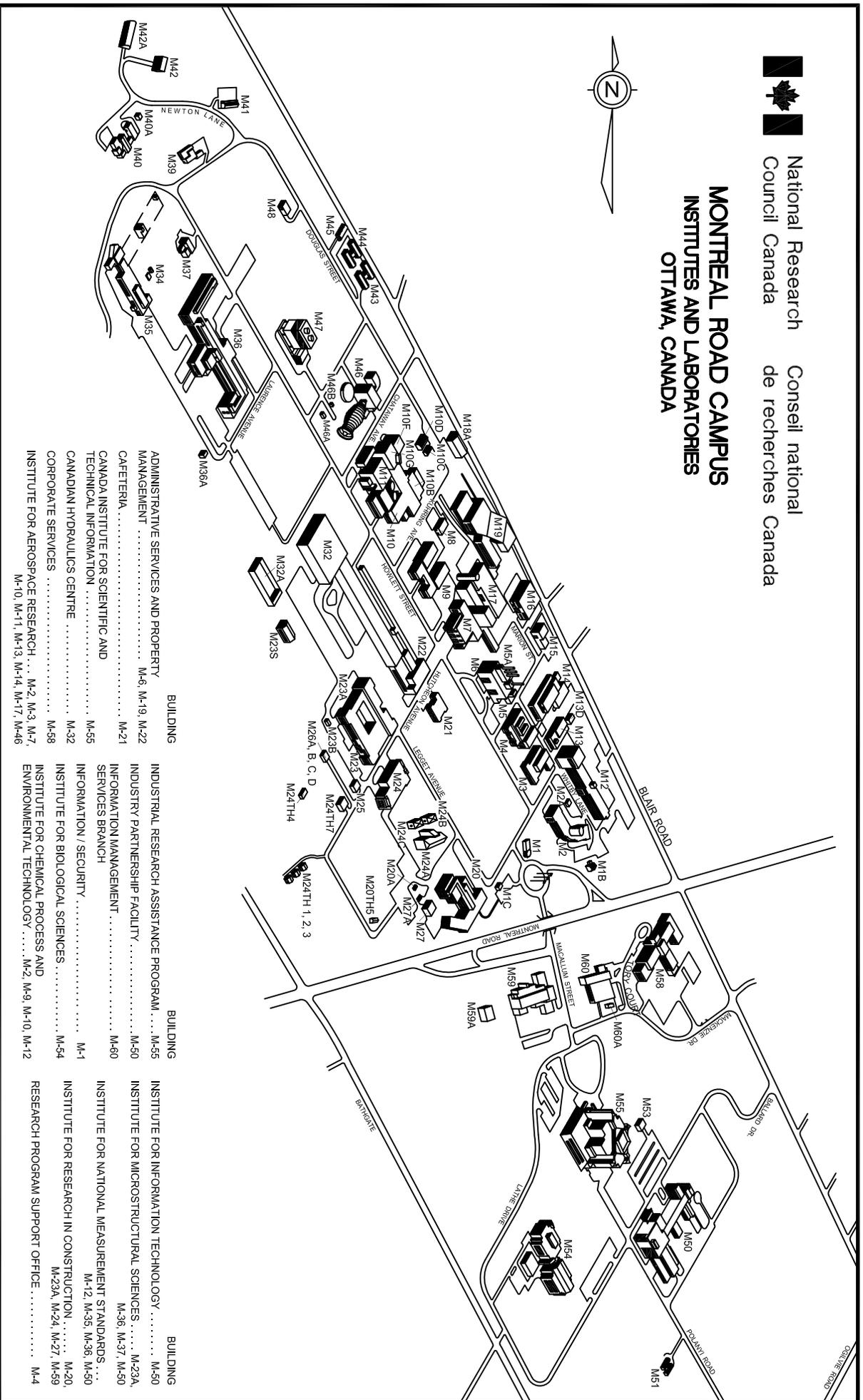


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|  NRC Institute |  Major HWY |  Airport |  Ferry |  Metro |
|  Trans Canada HWY |  Secondary HWY |  Train Station |  Bus Station | |



National Research Council Canada
 Conseil national de recherches Canada

MONTREAL ROAD CAMPUS INSTITUTES AND LABORATORIES OTTAWA, CANADA



- | | | | | |
|--|----------|--|----------|--|
| ADMINISTRATIVE SERVICES AND PROPERTY MANAGEMENT M-6, M-19, M-22 | BUILDING | INDUSTRIAL RESEARCH ASSISTANCE PROGRAM M-55 | BUILDING | INSTITUTE FOR INFORMATION TECHNOLOGY M-50 |
| CAFETERIA M-21 | | INDUSTRY PARTNERSHIP FACILITY M-50 | | INSTITUTE FOR MICROSTRUCTURAL SCIENCES M-23A, M-36, M-37, M-50 |
| CANADA INSTITUTE FOR SCIENTIFIC AND TECHNICAL INFORMATION M-55 | | SERVICES BRANCH | | INSTITUTE FOR NATIONAL MEASUREMENT STANDARDS M-12, M-35, M-36, M-50 |
| CANADIAN HYDRAULICS CENTRE M-32 | | INFORMATION / SECURITY M-1 | | INSTITUTE FOR RESEARCH IN CONSTRUCTION M-20, M-23A, M-24, M-27, M-59 |
| CORPORATE SERVICES M-58 | | INSTITUTE FOR BIOLOGICAL SCIENCES M-54 | | RESEARCH PROGRAM SUPPORT OFFICE M-4 |
| INSTITUTE FOR AEROSPACE RESEARCH M-2, M-3, M-7, M-10, M-11, M-13, M-14, M-17, M-46 | | INSTITUTE FOR CHEMICAL PROCESS AND ENVIRONMENTAL TECHNOLOGY M-2, M-9, M-10, M-12 | | |

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Administrative Services & Property management Branch (ASPM)	Direction des services administratifs et de la gestion de l'immobilier (SAGI)
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Formulaire de proposition – Marché de construction

Titre du projet M19- Amalgamation des magasins, Phase I

No. de Proposition: 17-22098

1.2 **Nom d'entreprise et adresse du soumissionnaire**

Nom _____

Adresse _____

Personne-ressource (nom en lettres moulées) _____

Téléphone (_____) _____ Téléc. (_____) _____

1.3 **Offre de prix**

Le soumissionnaire soussigné offre par les présentes à Sa Majesté du chef du Canada (ci-après appelée « Sa Majesté »), représentée par le Conseil national de recherches du Canada, d'exécuter et d'achever les travaux se rapportant au projet désigné ci-haut, conformément aux plans et devis et aux autres documents d'appel d'offres, à l'endroit et de la manière énoncés aux présentes, pour un montant total de _____, _____ \$ (montant numéraire uniquement) **dans la monnaie ayant cours légal au Canada (TPS/TVH en sus).**

Le montant de l'offre comprend toutes les taxes fédérales, provinciales et municipales applicables^(*). Cependant, si l'une des taxes imposées en vertu de la *Loi sur l'accise*, de la *Loi sur la taxe d'accise*, de la *Loi sur la sécurité de la vieillesse*, de la *Loi sur les douanes*, du tarif des douanes ou de toute autre loi provinciale imposant une taxe de vente au détail sur les achats de biens meubles incorporés à un bien immobilier est modifiée et que cette modification survient :

- .1 après que la présente proposition ait été mise à la poste ou livrée; ou
 - .2 si la présente proposition est révisée, après la dernière révision;
- le montant de l'offre de prix devra être diminué ou augmenté de la manière prévue à l'article CG22 des Conditions générales du contrat.

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Administrative Services & Property management Branch (ASPM)	Direction des services administratifs et de la gestion de l'immobilier (SAGI)

1.3.1 Offre de prix (suite)

(*) Dans le cadre de la présente proposition, la taxe sur les produits et services (TPS) n'est pas une taxe applicable.

Dans la province de Québec, la taxe de vente du Québec (TVQ) ne doit pas être ajoutée au montant de l'offre, le gouvernement fédéral étant exempté de la TVQ. Les soumissionnaires doivent s'adresser directement au ministère du Revenu provincial pour récupérer toute taxe qu'ils sont appelés à verser sur des biens et services acquis dans le cadre de l'exécution du présent marché. Les soumissionnaires devraient cependant inclure dans le montant de leur offre de prix tout montant de TVQ pour lequel ils ne peuvent exiger un remboursement de taxe sur les intrants.

1.4 Acceptation et conclusion du marché

Le soumissionnaire soussigné s'engage, dans les quatorze (14) jours suivant l'avis confirmant l'acceptation de la présente proposition, à signer un contrat portant sur l'exécution des travaux, à condition que l'avis d'acceptation du Ministère parvienne au soumissionnaire dans un délai de trente (30) jours suivant la date de clôture de l'appel d'offres.

1.5 Délai d'exécution des travaux

Le soumissionnaire soussigné s'engage à achever les travaux dans le délai stipulé au devis, lequel commence à courir à compter de l'avis d'acceptation de la présente proposition.

1.6 Garantie de soumission

Le soumissionnaire soussigné joint à la présente proposition une garantie de soumission, conformément à l'article 5 des Instructions générales à l'intention des soumissionnaires.

Le soumissionnaire soussigné convient que dans l'éventualité où il refuse de conclure un contrat qu'il est tenu de conclure en vertu des présentes, tout dépôt de garantie fourni à titre de garantie de soumission sera retenu pour débit. Cependant, le Ministre peut, au nom de l'intérêt public, renoncer au droit de Sa Majesté de retenir pour débit le dépôt de garantie.

Le soumissionnaire soussigné convient que si la garantie de soumission n'est pas conforme aux modalités de l'article 5 des Instructions générales à l'intention des soumissionnaires, sa proposition peut être jugée irrecevable.

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Administrative Services & Property management Branch (ASPM)	Direction des services administratifs et de la gestion de l'immobilier (SAGI)
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1.7 Garantie d'exécution

Dans les quatorze (14) jours suivant l'avis d'acceptation de sa proposition, le soumissionnaire soussigné doit fournir une garantie d'exécution contractuelle, conformément à la section F, Conditions contractuelles, du contrat.

Le soumissionnaire soussigné convient que la garantie d'exécution visée par les présentes, si elle est fournie sous forme de lettre de change, sera versée au Trésor public du Canada.

1.8 Annexes

L'annexe n° n/a fait partie intégrante de la présente proposition.

1.9 Addenda

Le montant total de l'offre de prix porte sur l'exécution des travaux définis dans les addenda suivants :

N°	DATE	N°	DATE

(Les soumissionnaires doivent indiquer le numéro et la date des addenda.)

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

Les soumissionnaires doivent consulter l'article 2 des Instructions générales à l'intention des soumissionnaires.

**SIGNÉ, AUTHENTIFIÉ ET REMIS le _____^e jour du mois de
_____ au nom de**

(Inscrire le nom d'entreprise du soumissionnaire)

SIGNATAIRE(S) AUTORISÉ(S)

(Signature du signataire autorisé)

(Inscrire le nom et le titre du signataire en lettres moulées)

(Signature du signataire autorisé)

(Inscrire le nom et le titre du signataire en lettres moulées)

SCEAU

ANNONCE ACHATSETVENTES

M-19, Amalgamation des magasins, Phase I

Le Conseil national de recherches du Canada, 1200 chemin Montréal, Ottawa, ON, a une demande pour un projet qui comprend :

STRUCTURE : (Les travaux incluent mais ne se limitent pas à)

- a) La modification de la plateforme mécanique existante pour accommoder les nouveaux équipements mécaniques

ARCHITECTURE: (les travaux incluent mais ne se limitent pas à) Réaménagement des bureaux

- a) Construction de nouveaux murs, plafonds et surfaces de plancher

MECANIQUE : Modifications aux systèmes existants, incluant la fourniture de nouveaux équipements pour accommoder le réaménagement des bureaux. (Les travaux incluent mais ne se limitent pas à)

- a) Modification du système CVCA existant pour accommoder la nouvelle disposition
- b) Modification de la localisation des gicleurs existants pour accommoder la nouvelle disposition
- c) La fourniture de nouveau système d'air conditionné modulaires sans conduits pour refroidissement en période hors saison c/a tous les accessoires et équipements requis
- d) Une mise à jour du système de contrôle et des séquences de contrôle pour incorporer les modifications CVCA et l'addition des nouveaux systèmes de refroidissement supplémentaire

ELECTRIQUE: Modifications aux systèmes existants, incluant la fourniture de nouvel équipement pour accommoder pour accommoder le réaménagement des bureaux (Les travaux incluent mais ne se limitent pas à)

- a) Fourniture de nouveaux appareils d'éclairage et contrôles
- b) Fourniture de nouveaux réceptacles et conduits/boîtiers pour les sorties de données
- c) Fourniture de nouveaux conduits pour câblage de distribution des données.
- d) Remplacement du panneau existant L10 avec un nouveau panneau de 42 circuits
- e) Branchement électrique des nouveaux équipements mécaniques

1. GENERAL :

Adresser à le représentant ministériel (ou à son représentant) ou à l'Agent des contrats toute question portant sur tout aspect du projet. Ils sont les seuls autorisés à fournir des réponses.

On ne tiendra nullement compte des informations obtenues d'une personne autre que le représentant ministériel (ou son représentant) ou l'Agent des contrats et ce, autant à l'octroi du contrat qu'au cours des travaux.

Les entreprises souhaitant présenter des soumissions pour ce projet devraient obtenir les documents relatifs aux appels d'offres en s'adressant au fournisseur de service Achatsetventes.gc.ca AGAO. Si des addenda sont ajoutés, ils seront distribués par Achasetventes.gc.ca AGAO. Les entreprises qui choisissent de préparer leurs soumissions en se fondant sur des documents d'appel d'offres provenant d'autres sources le font à leurs propres risques et seront tenues d'informer le responsable de l'appel d'offres de leur intention de soumissionner. Les trousse d'appel d'offres ne pourront être diffusées le jour même de la clôture des soumissions.

2. . VISITE DU SITE OBLIGATOIRE

Les soumissionnaires ont l'obligation de participer à une des visites du site à la date et à l'heure prévues. Les soumissionnaires qui ont l'intention de présenter une soumission doivent envoyer au moins un représentant à cette visite.

Les visites de chantier se tiendront le 22 novembre et le 24 novembre, 2017 à **9 :00**. Rencontrer Janik Leroux à l'édifice M-19, 1200 chemin Montréal, Ottawa, ON. Les soumissionnaires qui, pour une raison quelconque, ne peuvent pas participer à la visite à la date et à l'heure prévues ne pourront obtenir un deuxième rendez-vous; leur soumission sera donc considérée comme non conforme. **AUCUNE EXCEPTION NE SERA FAITE.**

Pour prouver qu'ils ont participé à la visite du site, les soumissionnaires ou leurs représentants DOIVENT signer, lors de la visite, le formulaire de participation élaboré par l'autorité contractante. Les soumissionnaires ou leurs représentants ont la responsabilité de vérifier s'ils ont bien signé ce formulaire avant de quitter le site. Les soumissions présentées par des soumissionnaires qui n'ont pas participé à la visite du site ou qui ont oublié de signer le formulaire de participation seront considérées comme non conformes.

3. DATE DE FERMÉTURE :

La date de fermeture est le 19 décembre, 2017 14 :00

4. RÉSULTATS DE L'APPEL D'OFFRES :

À la fermeture de l'appel d'offres, les résultats de l'appel d'offre seront envoyés par télécopieur à tous les entrepreneurs qui auront soumis un appel d'offre.

5. CRITÈRES DE SÉCURITÉ OBLIGATOIRES POUR LES ENTREPRENEURS

5.1 EXIGENCES OBLIGATOIRES RELATIVES A LA SECURITE

- .1 L'entrepreneur doit détenir en permanence, pendant l'exécution du contrat à commandes, une attestation de vérification d'organisation désignée (VOD) en vigueur, délivrée par la Direction de la sécurité industrielle canadienne (DSIC) de Travaux publics et Services gouvernementaux Canada (TPSGC).**
- .2 Les membres du personnel de l'entrepreneur devant avoir accès à des établissements de travail dont l'accès est réglementé doivent TOUS détenir une cote de FIABILITÉ en vigueur, délivrée ou approuvée par la DSIC de TPSGC.**
- .3 L'entrepreneur doit respecter les dispositions:**
 - a) de la Liste de vérification des exigences relatives à la sécurité et directive de sécurité (s'il y a lieu), reproduite à l'Annexe D;**
 - b) du Manuel de la sécurité industrielle (dernière édition)@ <http://ssi-iss.tpsgc-pwgsc.gc.ca/msi-ism/msi-ism-fra.html>**

5.2 VÉRIFICATION DE L'ATTESTATION DE SÉCURITÉ À LA CLÔTURE DES SOUMISSIONS

- .1 Le soumissionnaire doit détenir une attestation de vérification d'organisation désignée (VOD) en vigueur, délivrée par la Direction de la sécurité industrielle canadienne (DSIC) de Travaux publics et Services gouvernementaux Canada (TPSGC) **ET DOIT L'INCLURE AVEC LEUR****

SOUSSION OU FAIRE SUIVRE DANS LES 48 HEURES SUIVANT LA DATE ET L'HEURE DE CLÔTURE DE L'APPEL D'OFFRE. Des vérifications

seront effectuées par l'intermédiaire de la DSIC pour confirmer l'attestation de sécurité du soumissionnaire. L'omission de se conformer à cette exigence rendra la soumission non conforme et celle-ci sera rejetée.

- .2 L'entrepreneur général doit nommer tous ses sous-traitants dans un délai de 72 heures suivant la clôture des soumissions, et ceux-ci doivent aussi détenir une attestation VOD valide et soumettre les noms, dates de naissance ou numéros de certificats de sécurité de toutes les personnes qui seront affectées au projet.
- .3 Il faut noter que les sous-traitants qui doivent exécuter des tâches pendant l'exécution du contrat subséquent doivent aussi satisfaire aux exigences obligatoires du contrat en matière de sécurité. De plus, aucune personne ne possédant pas le niveau de sécurité exigé ne sera admise sur le site. Le soumissionnaire retenu devra s'assurer que les exigences liées à la sécurité sont satisfaites pendant toute l'exécution du contrat. La Couronne ne sera tenue responsable d'aucun retard ni d'éventuels coûts supplémentaires liés à l'inobservation par l'entrepreneur des exigences en matière de sécurité. L'omission de satisfaire à ces exigences sera suffisante pour résilier le contrat pour cause d'inexécution.
- .4 Pour toute question concernant les exigences liées à la sécurité pendant la période de soumission, les soumissionnaires doivent communiquer avec l'agente de sécurité @ 613-993-8956.

6.0 CSPAAT (COMMISSION DE LA SECURITE PROFESSIONNELLE ET DE L'ASSURANCE CONTRE LES ACCIDENTS DU TRAVAIL

- .1 Tous les soumissionnaires doivent fournir une attestation de la CSPAAT valide avec leur offre ou avant l'attribution du contrat.

7.0 L'OMBUDSMAN DE L'APPROVISIONNEMENT

- .1 **Services de règlement des différends**
Les parties reconnaissent que l'ombudsman de l'approvisionnement nommé en vertu du paragraphe 22.1(1) de la *Loi sur le ministère des Travaux publics et des Services gouvernementaux* veillera à proposer aux parties concernées un processus de règlement de leur différend, sur demande ou consentement des parties à participer à un tel processus de règlement extrajudiciaire en vue de résoudre un différend entre elles au sujet de l'interprétation ou de l'application d'une modalité du présent contrat, et obtiendra leur consentement à en assumer les coûts. Le Bureau de l'ombudsman de l'approvisionnement peut être joint par téléphone, au 1-866-734-5169 ou par courriel, à l'adresse boa.opo@boa-opo.gc.ca.
- .2 **Administration du contrat**
Les parties reconnaissent que l'ombudsman de l'approvisionnement nommé en vertu du paragraphe 22.1(1) de la *Loi sur le ministère des Travaux publics et des Services gouvernementaux* examinera une plainte déposée par [le fournisseur ou l'entrepreneur ou le nom de l'entité à qui ce contrat a été attribué] concernant l'administration du contrat si les exigences du paragraphe 22.2(1) de la *Loi sur le ministère des Travaux publics et des Services gouvernementaux* et les articles 15 et 16 du *Règlement concernant l'ombudsman de l'approvisionnement* ont été respectées, et si l'interprétation et l'application des modalités ainsi que de la portée du contrat ne sont pas contestées. Le Bureau de l'ombudsman de

l'approvisionnement peut être joint par téléphone, au 1-866-734-5169 ou par courriel, à l'adresse boa.opo@boa-opo.gc.ca.

- .3 Le Bureau de l'ombudsman de l'approvisionnement (BOA) a été mis sur pied par le gouvernement du Canada de manière à offrir aux fournisseurs un moyen indépendant de déposer des plaintes liées à l'attribution de contrats de moins de 25 000 \$ pour des biens et de moins de 100 000 \$ pour des services. Vous pouvez soulever des questions ou des préoccupations concernant une demande de soumissions ou l'attribution du contrat subséquent auprès du BOA par téléphone, au 1-866-734-5169 ou par courriel, à l'adresse boa.opo@boa-opo.gc.ca. Vous pouvez également obtenir de plus amples informations sur les services qu'offre le BOA, en consultant son site Web, à l'adresse www.opo-boa.gc.ca.

Le représentant ministériel responsable ou son représentant: Janik Leroux
Téléphone: 613 993-9149

L'autorité contractante : Alain Leroux alain.leroux@nrc-cnrc.gc.ca
Téléphone : 613 993-2274

INSTRUCTIONS AUX SOUMISSIONNAIRES

Article 1 - Réception des soumissions

- 1a) Aucune soumission reçue après le moment fixé pour la clôture des soumissions ne sera acceptée. LES SOUMISSIONS RECUES APRES LE MOMENT FIXÉ NE SONT PAS VALIDES et ne peuvent être prises en considération, peu importe la raison de leur retard.
- 1b) Une lettre ou une télécommunication imprimée envoyée par un soumissionnaire pour signifier un prix ne peut être considérée comme étant une soumission valide à moins qu'une soumission officielle n'ait été reçue sur la formule prescrite à cette fin.
- 1c) Il est loisible aux soumissionnaires de modifier leurs soumissions par lettre ou télécommunication imprimée mais à condition que de telles modifications ne soient pas reçues plus tard qu'au moment prévu pour la clôture des soumissions.
- 1d) Les modifications à la soumission qui sont transmises par télécopieur doivent être signées et doivent permettre d'identifier sans équivoque le soumissionnaire.

Toutes les modifications de ce genre doivent être envoyées à :

Conseil national de recherches Canada
Services d'approvisionnement
Alain Leroux, agent supérieur de contrats
Édifice M-22

Chemin Montréal, Ottawa (Ontario)
K1A 0R6

Télécopieur: (613) 991-3297

Article 2 - Formule de soumission et qualifications

- 1) Toutes les soumissions doivent être présentées sur la formule de soumission - construction et être signées en conformité avec les exigences suivantes:
 - a) Société à responsabilité limitée : le nom complet de la société ainsi que le nom et le titre des fondés de signature autorisés doivent être imprimés dans l'espace prévu à cette fin. La signature des fondés de signature et le sceau de la société doivent être apposés.
 - b) Société de personne : le nom de l'entreprise ainsi que le(s) noms du (des) signataire(s) doivent être imprimés dans l'espace prévu. L'un ou plusieurs des associés doivent signer en présence d'un témoin qui, lui aussi, doit apposer sa signature. Un sceau de couleur adhésif doit être apposé en regard de chaque signature.
 - c) Entreprise à propriétaire unique : le nom de l'entreprise et le nom du propriétaire unique doivent être imprimés dans l'espace prévu. Le propriétaire est tenu de signer en présence d'un témoin qui doit lui aussi apposer sa signature. Un sceau de couleur adhésif doit être apposé en regard de chaque signature.
- 2) Toute modification à la partie imprimée de la formule de soumission - construction ou tout défaut de fournir l'information qui y est demandée peut invalider la soumission.
- 3) Toutes les rubriques de la formule de soumission - construction doivent être remplies et les corrections manuscrites ou dactylographiées apportées aux parties ainsi remplies doivent être paraphées par la ou les personnes qui signe(nt) la soumission au nom du soumissionnaire.
- 4) Les soumissions doivent être basées sur les plans, devis et documents de soumission fournis.

Article 3 - Contrat

- 1) L'entrepreneur devra signer un contrat semblable à la formule standard pour contrats de construction à prix fixe dont un exemplaire en blanc est annexé dos à la présente brochure pour information.

Article 4 - Destinataire de la soumission

- 1a) Les soumissions doivent être envoyées sous enveloppe cachetée adressée à l'Agent de contrats, **Conseil national de recherches, Services administratifs et gestion de l'immobilier, édifice M-22, 1200 chemin Montréal, Ottawa, ON. K1A 0R6** Canada, et la mention "Soumission relative à (inscrire le titre de travail apparaissant sur les dessins et le cahier des charges)" ainsi que le nom et l'adresse du soumissionnaire doivent apparaître sur l'enveloppe.
- 1b) Sauf dispositions contraires, les seuls documents à soumettre pour la soumission sont la formule de soumission et la garantie de soumission.

Article 5 - Garantie

- 1a) La garantie de soumission est requise. La garantie doit alors être soumise sous l'une ou l'autre des formes suivantes :

- i) un chèque certifié payable au Receveur général du Canada et tiré sur un établissement membre de l'Association canadienne des paiements ou un établissement de crédit coopératif local membre d'une société centrale de crédit coopératif elle-même membre de l'Association canadienne des paiements OU
 - ii) des obligations du gouvernement du Canada, ou des obligations avec garantie inconditionnelle par le gouvernement du Canada quant au capital et aux intérêts, OU
 - iii) un cautionnement de soumission.
- 1b) Peu importe la forme de la garantie de soumission, elle ne devrait jamais dépasser la somme de 250 000 \$ calculée à 10% de la première tranche de 250 000 \$ du prix soumissionné, plus 5% de tout montant dépassant 250 000 \$.
- 2a) Une garantie de soumission doit être fournie avec chaque soumission. Elle peut aussi être envoyée séparément à condition qu'elle ne soit pas reçue plus tard qu'au moment prévu pour la clôture des soumissions. On doit fournir l'ORIGINAL de la garantie de soumission. Des garanties transmises par télécopieur ou des photocopies NE SONT PAS acceptées. **DEFAUT DE FOURNIR LA GARANTIE REQUISE RENDRA LA SOUMISSION INVALIDE.**
- 2b) Dans le cas où la soumission n'est pas acceptée, la garantie de soumission fournie en conformité avec l'article 8 sera retournée au soumissionnaire.
- 3a) L'adjudicataire doit fournir une garantie au plus tard 14 jours après réception d'un avis lui signifiant l'acceptation de sa soumission. Il doit fournir L'UN OU L'AUTRE des documents suivants :
- i) Un dépôt de garantie tel que décrit à l'alinéa 1b) ci-dessus ainsi qu'un cautionnement du paiement de la main d'oeuvre et des matériaux s'élevant à 50%, au moins, de la somme payable en vertu du contrat, OU
 - ii) Une garantie d'exécution et un cautionnement du paiement de la main d'oeuvre et des matériaux, chacun s'élevant à 50% du montant payable en vertu du contrat.
- 3b) Au cas où il ne serait pas possible d'obtenir un cautionnement du paiement de la main d'oeuvre et des matériaux, tel que requis aux termes de l'alinéa 3a) ci-dessus, en s'adressant par conséquent à au moins deux compagnies de garantie acceptables, un dépôt de garantie supplémentaire s'élevant à 10% exactement du montant payable en vertu du contrat doit être fourni.
- 3c) Lorsqu'une soumission a été accompagnée d'un dépôt de garantie tel que décrit à l'alinéa 1b) ci-dessus, le montant du dépôt de garantie requis en vertu de l'alinéa 3a) ci-dessus peut être réduit du montant du dépôt de garantie qui accompagnait la soumission.
- 3d) Les obligations doivent être de la forme approuvée et doivent être émises par des compagnies dont les obligations sont acceptées par le gouvernement du Canada. Des modèles de la forme approuvée des garanties à déposer par les soumissionnaires, des garanties d'exécution et des cautionnements du paiement de la main-d'oeuvre et des matériaux ainsi qu'une liste des compagnies de garantie acceptables peuvent être obtenus en s'adressant au Services d'approvisionnement, Conseil national de recherches du Canada, édifice M-22, chemin Montréal, Ottawa (Ontario) K1A 0R6, Canada.

Article 6 - Intérêt payé sur les dépôts de garantie

- 1) Les soumissionnaires sont avertis qu'ils doivent se mettre d'accord personnellement avec leurs banquiers relativement à l'intérêt, le cas échéant, payé sur le montant du chèque certifié accompagnant leur soumission. Le Conseil ne paiera pas d'intérêt sur ledit chèque en attendant l'adjudication du contrat et ne sera pas non plus responsable du paiement des intérêts en vertu de toute disposition prise par les soumissionnaires.

Article 7 - Taxe sur les ventes

- 1) Le montant de la soumission doit comprendre toutes les taxes prélevées en vertu de la Loi sur l'accise, de la Loi sur la taxe d'accise, de la Loi sur la sécurité de la vieillesse, de la Loi sur les douanes ou du Tarif des douanes en vigueur ou applicables à ce moment.
- 2) Au Québec, la taxe provinciale ne doit pas être incluse au montant soumissionné, car le Gouvernement Fédéral en est exclu. Les soumissionnaires devront faire les démarches nécessaires auprès du Ministère du Revenu provincial pour recouvrer toute taxe payée sur les biens et services dans le cadre de ce contrat.

Cependant, les soumissionnaires devraient inclure dans leur prix, les taxes provinciales pour lesquelles les remboursements ne s'appliquent pas.

Article 8 - Examen de l'emplacement

- 1) Tous les soumissionnaires examineront l'emplacement des travaux proposés avant d'envoyer leur soumission, étudieront minutieusement ledit emplacement et obtiendront tous les renseignements nécessaires à la bonne exécution du contrat. Aucune réclamation postérieure ne sera permise ou admise relativement à tout travail ou matériaux pouvant être requis et nécessaires à la bonne exécution du présent contrat à l'exception des dispositions de l'article CG 35 des Conditions générales du cahier des charges général.

Article 9 - Erreurs, omissions, etc.

- 1a) Les soumissionnaires relevant des erreurs ou des omissions dans les dessins, le cahier des charges ou d'autres documents, ou ayant des doutes quant au sens ou à l'intention de n'importe quelle partie de ces derniers, devront en avvertir immédiatement l'ingénieur qui fera parvenir des directives ou des explications écrites à tous les soumissionnaires.
- 1b) Ni l'ingénieur, ni le Conseil ne seront responsables des directives orales.
- 1c) Les additions ou les corrections effectuées au cours de la présentation des soumissions seront incluses dans la soumission. Cependant, le contrat remplace toutes les communications, négociations et tous les accords, sous forme verbale ou écrite, se rapportant aux travaux et effectués avant la date du contrat.

Article 10 - Nul paiement supplémentaire pour accroissement des frais

- 1) Les seules autres modifications pouvant être apportées au prix forfaitaire sont celles précisées dans les Conditions générales du Cahier des charges général. Le prix forfaitaire ne sera pas modifié à la suite de changements dans les tarifs de transport, les cotes des changes, les échelles de salaire, le coût des matériaux, de l'outillage ou des services.

Article 11 - Adjudication

- 1a) Le Conseil se réserve le pouvoir et le droit de rejeter les soumissions provenant de parties ne possédant pas les connaissances et la préparation requises à la bonne exécution de la catégorie

de travaux mentionnés dans les présentes et précisés dans les plans. Les soumissionnaires doivent fournir la preuve de leur compétence lorsque cela est exigée.

- 1b) Un soumissionnaire peut être tenu de faire parvenir au Services d'approvisionnement, Conseil national de recherches Canada, édifice M-22, chemin Montréal, Ottawa (Ontario) K1A OR6, Canada, des copies non signées des polices d'assurance auxquelles il envisage de souscrire pour satisfaire aux exigences relatives aux assurances comprises dans les Conditions d'assurance du Cahier des charges général.
- 1c) Le Conseil ne s'engage pas à accepter la soumission la plus basse ni une soumission quelconque.

Article 12 - Taxe TPS

- 1) La TPS qui est maintenant en vigueur est applicable à cette proposition; cependant, l'entrepreneur devra proposer un prix NE COMPRENNANT PAS la TPS. La TPS détaillée séparément dans toutes les factures et demandes de paiement partiel présentées pour des produits fournis ou un travail accompli et sera payée par le Canada. Le montant de la TPS sera inclus dans le prix total du contrat. L'Entrepreneur convient de verser à Revenu Canada tout montant payé ou dû au titre de la TPS.

Entrepreneurs non résidents

Guide de la TVD 804F

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Avis aux lecteurs : Concernant la taxe de vente au détail (TVD) – Le 1^{er} juillet 2010, la taxe de vente harmonisée (TVH) de 13 % est entrée en vigueur en Ontario pour remplacer la TVD provinciale en la combinant avec la taxe fédérale sur les produits et services (TPS). Conséquemment, les dispositions de la TVD décrites dans cette page et dans d'autres publications ont expiré le 30 juin 2010.

A compter du 1^{er} juillet 2010, cette publication fait partie des archives pour la TVD **seulement**. Puisque ce document reflète la loi de la TVD qui était en vigueur au moment où il fut publié et peut ne plus être valide, veuillez l'utiliser avec prudence.

- Les renseignements contenus dans le présent Guide décrivent les responsabilités d'un entrepreneur non résident qui obtient un contrat en vue d'effectuer des travaux de construction en Ontario, ainsi que celles de ses clients ontariens. Veuillez prendre note que le présent Guide remplace la version précédente publiée en mars 2001.

Définition d'un entrepreneur non résident

Un entrepreneur non résident est un entrepreneur en construction dont le siège social est situé à l'extérieur de l'Ontario et qui a obtenu un contrat de construction pour effectuer des travaux en Ontario, mais qui n'a pas tenu de façon continue un établissement stable en Ontario au cours des douze mois qui ont précédé la signature du contrat, ou qui n'est pas une société constituée en Ontario. Un contrat de construction est un contrat pour ériger, remodeler ou réparer un bâtiment ou autre structure situé sur un terrain.

Un entrepreneur est une personne qui se livre à la construction, la modification, la réparation ou la rénovation de biens immobiliers et s'entend, sans s'y limiter,

1. d'un entrepreneur général et d'un sous-traitant,
2. d'un charpentier, d'un maçon, d'un tailleur de pierres, d'un électricien, d'un plâtrier, d'un plombier, d'un peintre, d'un décorateur, d'un paveur et d'un constructeur de ponts,
3. d'un entrepreneur en tôle, en carreaux et en terrazzo, en chauffage, en climatisation, en isolation, en ventilation, en pose de papier peint, en construction de routes, en revêtement de toiture et en ciment,

qui installe ou qui incorpore des articles dans un bien immobilier. (Consultez le Guide de la taxe de vente au détail n° 206F - Biens immobiliers et accessoires fixes).

Inscription et cautionnement

Tout entrepreneur non résident à qui l'on accorde un contrat de construction pour des travaux en Ontario doit s'inscrire auprès du ministère des Finances (ministère), Unité des programmes centralisés, et verser un cautionnement équivalent à 4 p. 100 du total de la valeur de chaque contrat. Ce cautionnement peut être acquitté en espèces, par chèque certifié (libellé à l'ordre du Ministre des Finances), par lettre de crédit ou par certificat de cautionnement.

Afin de s'inscrire auprès du ministère et pour obtenir plus de précisions sur le dépôt d'un cautionnement, les entrepreneurs peuvent communiquer avec l'Unité des programmes centralisés du ministère, 33, rue King Ouest, CP 623, Oshawa, Ontario, L1H 8H7, sans frais 1 866 ONT-TAXS (1 866 668-8297) ou télécopieur 905) 435-3617.

Tout entrepreneur non résident qui vend et qui fournit seulement des biens taxables à des clients de l'Ontario, ou qui fournit des services taxables en Ontario, peut obtenir un permis de vendeur régulier lui permettant de percevoir et remettre la TVD sur ses ventes. Tout entrepreneur non résident à qui un permis de vendeur régulier a été émis doit tout de même s'inscrire séparément auprès du ministère et verser un cautionnement s'il se voit accorder un contrat de construction en Ontario.

Lettre de conformité

Après avoir reçu le cautionnement, le ministère envoie à l'entrepreneur non résident une lettre de conformité en deux exemplaires attestant que les exigences relatives à la TVD ont bien été respectées. L'entrepreneur doit alors remettre un exemplaire de cette lettre à son client.

S'il omet de le faire, le client doit retenir 4 p. 100 de chaque paiement dû à l'entrepreneur non résident et remettre les sommes retenues au Ministre des Finances (le ministre). Les paiements doivent être envoyés à l'Unité des programmes centralisés en prenant soin d'y joindre les détails du contrat visé. Au lieu d'effectuer ces paiements de 4 p. 100, le client peut remettre au ministre un certificat de cautionnement équivalant à 4 p. 100 du prix contractuel total.

Remarque : Tout client qui néglige d'observer ces règles pourrait être tenu de verser une somme égale à 4 % de tous les montants payables à l'entrepreneur non résident ou tout autre montant qui, de l'avis du ministère, devrait être assujéti à la TVD à la suite de l'exécution du contrat.

Calcul de la TVD

Juste valeur

La TVD doit être versée sur la « juste valeur » des matériaux achetés ou importés en Ontario et utilisés pour l'exécution du contrat en Ontario. Par « juste valeur », on entend :

- le prix d'achat en devises canadiennes;
- tous les frais de manutention et de livraison facturés par le fournisseur; et
- tous les droits de douane ainsi que les taxes de vente et d'accise fédérales (mais non la taxe fédérale sur les produits et services [TPS]).

L'entrepreneur est aussi tenu de payer la TVD aux fournisseurs de l'Ontario au moment de l'achat ou de la location (avec ou sans bail) de services, matériaux, machines ou d'équipement taxables.

Machines et équipement - loués à bail

Lorsque des machines ou un équipement loués auprès d'un fournisseur de l'extérieur de l'Ontario sont apportés dans la province, la TVD est exigible sur les paiements de location pendant toute la période de séjour des machines et de l'équipement en Ontario.

Machines et équipement - appartenant à l'entrepreneur

1. Si un entrepreneur apporte des machines et de l'équipement en Ontario pour une durée inférieure à douze mois, la TVD applicable doit être calculée selon la formule suivante :

$1/36 \times \text{valeur comptable nette à la date d'importation} \times \text{nombre de mois en Ontario} \times \text{taux de taxe.}$

Aux fins de cette formule, la TVD est exigible pour chaque mois ou partie de mois pendant lesquels les biens se trouvent en Ontario. En outre, on considère qu'un mois constitue une période de 31 jours consécutifs, et qu'une partie de mois représente plus de 12 jours. La TVD exigible est fondée sur le nombre de jours où les machines et l'équipement se trouvent en Ontario et non sur le nombre de jours d'utilisation effective des machines ou de l'équipement.

Exemple: De l'équipement est apporté en Ontario le 28 mars et sorti de la province le 8 mai. L'équipement a donc séjourné pendant 41 jours dans la province. La TVD est alors payable sur les 31 premiers jours de séjour temporaire en Ontario vs l'usage de l'équipement. Étant donné que la période restante (10 jours) n'est pas considérée comme une partie d'un mois, aucune TVD n'est exigible sur cette période.

1. Si l'on prévoit que les machines ou l'équipement apportés en Ontario resteront dans cette province pendant plus de 12 mois, l'entrepreneur doit payer la TVD selon la formule suivante :

$\text{valeur comptable nette à la date d'importation} \times \text{taux de taxe}$

Si, au moment de l'importation des machines et de l'équipement, la durée du séjour n'est pas connue, le vendeur peut appliquer la formule (a). Si, par la suite, il s'avère nécessaire de garder les machines et l'équipement en Ontario pendant une durée dépassant 12 mois, la TVD versée selon (a) pourra être déduite du montant de la TVD payable selon (b).

À l'aide de la formule (a) ou (b) ci-dessus, les entrepreneurs calculeront et remettront la TVD exigible sur la déclaration à produire une fois le contrat dûment exécuté.

Fabrication de matériel à des fins personnelles

Il arrive qu'un entrepreneur doive fabriquer divers éléments, tels que des portes et fenêtres, pour exécuter son contrat de construction. Par fabrication, il faut entendre tout travail effectué dans une usine à l'extérieur d'un chantier de construction, une unité mobile ou un atelier sur un chantier de construction ou à proximité de ce dernier. La fabrication a lieu lors de la transformation de matières brutes en produits fabriqués qui seront utilisés dans l'exécution de contrats immobiliers.

Un entrepreneur est considéré comme un entrepreneur fabricant si :

1. les produits fabriqués sont destinés à un usage personnel dans l'exécution de contrats immobiliers; et que
2. le coût de fabrication des produits dépasse 50 000 \$ par an.

(Consultez le Guide de la taxe de vente au détail no 401F - Entrepreneurs- fabricants).

Contrat avec le gouvernement fédéral

Lorsqu'un entrepreneur non résident conclut un contrat de construction avec le gouvernement fédéral, pour la construction d'un bâtiment et(ou) l'installation d'équipement, c'est la nature de l'équipement qui détermine si le contrat doit être soumissionné sur une base taxe comprise ou taxe non comprise.

Les contrats pour la construction d'un bâtiment et l'installation d'équipement qui dessert directement ce bâtiment (par ex. les ascenseurs, escaliers roulants, luminaires, systèmes de chauffage central, air climatisé, etc.) doivent être soumissionnés sur une base taxe comprise. L'entrepreneur est considéré comme le consommateur des articles utilisés dans l'exécution de ces contrats et doit payer ou rendre compte de la TVD sur les articles utilisés aux fins de ces contrats. Le simple fait qu'un contrat soit conclu avec le gouvernement fédéral ne donne pas droit, en soi, à une exemption.

Les contrats pour l'installation d'équipement qui devient un accessoire fixe et qui ne dessert pas directement un bâtiment (par ex. le matériel de manutention, l'outillage de production, l'équipement de télécommunication et le matériel de formation) peuvent être soumissionnés sur une base taxe non comprise. Les entrepreneurs qui entreprennent des contrats de ce genre sont permis d'acheter un tel équipement en exemption de la TVD en remettant un Certificat d'exemption de taxe valide aux fournisseurs. Seul un entrepreneur non résident inscrit auprès du ministère et ayant versé un cautionnement peut remettre un Certificat d'exemption de taxe.

Exonérations

Il arrive que des entrepreneurs fournissent et installent de l'équipement ou du matériel pour certains clients ayant droit à une exemption de la TVD (par ex. fabricants, conseils de bandes indiennes, agriculteurs et organismes diplomatiques). Une fois installés, l'équipement ou les matériaux deviennent des biens immobiliers s'ils sont fixés en permanence au sol, ou des accessoires fixes s'ils sont fixés de façon permanente à un bâtiment ou une structure immobilière. Étant donné que la responsabilité de la TVD incombe à l'entrepreneur, ce dernier doit communiquer avec le ministère pour déterminer si le client est admissible à l'exonération, avant d'offrir un contrat taxe non comprise.

Indiens inscrits, bandes indiennes et conseils de bandes indiennes

L'entrepreneur non résident peut acheter des matériaux de construction en exemption de la TVD pour certains bâtiments et certaines structures situés dans des réserves. Le coût de ces projets doit être défrayé par un conseil de bande, et les bâtiments doivent servir à des fins communautaires, au bénéfice de la réserve. Dans le cas de contrats pour des projets de construction communautaires exonérés de taxe, le contrat doit être offert sur une base taxe non comprise.

L'entrepreneur non résident peut acheter les matériaux sans payer la TVD s'il remet aux fournisseurs un Certificat d'exemption de taxe valide. Comme précisé ci-dessus, seul un entrepreneur non résident inscrit auprès du ministère et ayant versé un cautionnement peut remettre un Certificat d'exemption de taxe. (Consultez le Guide de la taxe de vente au détail [n° 204F - Certificats d'exemption de taxe](#)).

Les entrepreneurs non résidents doivent payer eux-mêmes la TVD sur les articles achetés à des fins d'incorporation à un bâtiment ou une structure, érigé à l'intention d'un Indien inscrit particulier dans une réserve. (Consultez le Guide de la taxe de vente au détail [n° 808F - Indiens inscrits, bandes indiennes et conseils de bandes indiennes](#)).

Exécution du contrat

Une fois le contrat dûment exécuté, l'entrepreneur qui a dû déposer un cautionnement doit remplir une « [Déclaration de la taxe de vente au détail - Entrepreneurs non résidents \[PDF - 93 KO\]](#) » qui est fournie par le ministère.

Lorsque le cautionnement a été acquitté en espèces ou par chèque certifié, le montant déposé peut être déduit de la TVD que l'entrepreneur doit payer. Si le montant de cette taxe est supérieur au montant déposé, l'entrepreneur doit verser la différence. Dans le cas contraire, si le montant déposé est supérieur au montant de la taxe exigible, la différence lui sera remboursée.

Si, au lieu d'un acquittement en espèces, un certificat de cautionnement a été déposé, ce dernier fera l'objet d'une main-levée une fois que le paiement de la taxe aura été intégralement acquitté. Toutes les déclarations peuvent faire l'objet d'une vérification.

Références législatives

- Loi sur la taxe de vente au détail, paragrafes 19 (2) et 39 (3) 4 et 5
- Règlement 1012 pris en application de la Loi, paragraphes 15.3 (1) (2) (5) (6) et (7)
- Règlement 1013 pris en application de la Loi, articles 1 et 3

Pour plus de renseignements

Les informations contenues dans cette publication ne sont données qu'à titre d'indication. Pour plus de renseignements, adressez-vous au ministère des Finances de l'Ontario en composant le 1 866 ONT-TAXS (1 866 668-8297) ou visitez notre site Web à ontario.ca/finances.

Compagnies de cautionnement reconnues

Publiée septembre 2010

Voici une liste des compagnies d'assurance dont les cautionnements peuvent être acceptés par le gouvernement à titre de garantie.

1. Compagnie canadiennes

Assurance ACE INA
Allstate du Canada, Compagnie d'assurances
Ascentus Ltée, Les Assurances (cautionnement seulement)
Aviva, Compagnie d'Assurance du Canada
AXA Assurances (Canada)
AXA Pacific Compagnie d'assurance
Le Bouclier du Nord Canadien, Compagnie d'Assurance
Certas direct, compagnie d'assurances (cautionnement seulement)
Chubb, Compagnie d'assurances du Canada
Commonwealth, Compagnie d'assurances du Canada
Compagnie d'assurance Chartis du Canada (anciennement La Cie d'assurance commerciale AIG du Canada)
Co-operators General, Compagnie d'assurance
CUMIS, Compagnie d'assurances générales
La Dominion du Canada, Compagnie d'assurances générales
Échelon, Compagnie D'Assurances Générale (cautionnement seulement)
Economical, Compagnie Mutuelle d'Assurance
Elite, Compagnie d'assurances

La Compagnie d'Assurance Everest du Canada
 Federated, Compagnie d'assurances du Canada
 Federation, Compagnie d'assurances du Canada
 La Compagnie d'assurance et de Garantie Grain
 Gore Mutual Insurance Company
 The Guarantee, Compagnie d'Amérique du Nord
 Industrielle Alliance Pacifique, Compagnie d'Assurances Générales
 Intact Compagnie d'assurance
 Jevco, Compagnie d'assurances (cautionnement seulement)
 Compagnie canadienne d'assurances générales Lombard
 Compagnie d'assurance Lombard
 Markel, Compagnie d'assurances du Canada
 Missisquoi, Compagnie d'assurances
 La Nordique compagnie d'assurance du Canada
 The North Waterloo Farmers Mutual Insurance Company (fidélité du personnel seulement)
 Novex Compagnie d'assurance (fidélité du personnel seulement)
 La Personnelle, compagnie d'assurances
 La Compagnie d'Assurance Pilot
 Compagnie d'Assurance du Québec
 Royal & Sun Alliance du Canada, société d'assurances
 Saskatchewan Mutual Insurance Company
 Compagnie d'Assurance Scottish & York Limitée
 La Souveraine, Compagnie d'Assurance Générale
 TD, Compagnie d'assurances générales
 Temple, La compagnie d'assurance
 Traders, Compagnie d'assurances générales
 La Compagnie Travelers Garantie du Canada
 Compagnie d'Assurance Trisura Garantie
 Waterloo, Compagnie d'assurance
 La Compagnie Mutuelle d'Assurance Wawanesa
 Western, Compagnie d'assurances
 Western, Compagnie de garantie

2. Compagnie provinciales

Les cautionnements de garantie des compagnies suivantes peuvent être acceptés à condition que le contrat de garantie soit conclu dans une province où la compagnie est autorisée à faire affaires, comme il est indiquée entre parenthèses.

AXA Boréal Assurances Inc. (I.-P.-É., N.-B., Qué., Ont., Man., C.-B.)
 ALPHA, Compagnie d'assurances Inc. (Québec)
 Canada West Insurance Company (Ont., Man., Sask., Alb., C.-B., T.-N.-O.) (cautionnement seulement)
 La Capitale assurances générales inc. (T.-N.-L., N.-É., I.-P.-É., Qué. (cautionnement seulement), Man., Sask., Alb. C.-B., Nun., T.-N.-O., Yuk.)
 Coachman Insurance Company (Ont.)
 La Compagnie d'Assurance Continental Casualty (T.-N.-L., N.-É., I.-P.-É., N.-B., Qué., Ont., Man., Sask., Alb. C.-B., Nun., T.-N.-O., Yuk.)
 GCAN Compagnie d'assurances (T.-N.-L., N.-É., I.-P.-É., N.-B., Qué., Ont., Man., Sask., Alb. C.-B., Nun., T.-N.-O., Yuk.)
 The Insurance Company of Prince Edward Island (N.-É., I.-P.-É., N.-B.)
 Kingsway Compagnie d'assurances générales (N.-E., N.-B., Qué., Ont., Man., Sask., Alb., et C.-B.)
 La Compagnie d'Assurance Liberté Mutuelle (T.-N.-L., N.-É., I.-P.-É., N.-B., Qué., Ont., Man., Sask., Alb. C.-B., Nun., T.-N.-O., Yuk.)
 Norgroupe Assurances Générales Inc.
 Orléans, compagnie d'assurance générale (N.-B., Qué., Ont.)

Saskatchewan Government Insurance Office (Sask.)
SGI CANADA Insurance Services Ltd. (Ont., Man., Sask., Alb.)
Société d'assurance publique du Manitoba (Man.)
Union Canadienne, Compagnie d'assurances (Québec)
L'Unique assurances générales inc. (T.-N.-L., N.-É., I.-P.-É, N.-B., Qué. (cautionnement seulement), Ont.
(cautionnement seulement), Man., Sask., Alb. C.-B. (cautionnement seulement), Nun., T.-N.-O., Yuk.)

3. Compagnie étrangères

Aspen Insurance UK Limited
Compagnie Française d'Assurance pour le Commerce Extérieur (fidélité du personnel seulement)
Eagle Star Insurance Company Limited
Société des Assurances Ecclésiastiques (fidélité du personnel seulement)
Lloyd's, Les Souscripteurs du
Mitsui Sumitomo Insurance Company, Limited
NIPPONKOA Insurance Company, Limited
Assurances Sompo du Japan
Tokio Maritime & Nichido Incendie Compagnie d'Assurances Ltée
XL Insurance Company Limited (cautionnement seulement)
Zurich Compagnie d'Assurances SA

Articles de convention

Contrat de construction – Articles de convention
(23/01/2002)

- A1 Contrat
- A2 Description des travaux et date d'achèvement
- A3 Prix du contrat
- A4 Adresse de l'entrepreneur
- A5 Tableau des prix unitaires

Articles de convention

Les présents Articles de convention faits en double le 8^{ième} jour de janvier, 2015

Entre

Sa Majesté la Reine, du chef du Canada (ci-après appelé “ Sa Majesté”) représentée par le Conseil National recherches du Canada. (ci-après appelé “ le Conseil”)

Et Les installations électriques Pichette Inc.

(ci-après appelé “l’Entrepreneur”)

Font foi que sa Majesté et l’Entrepreneur ont établi entre eux les conventions suivantes:

A1 Contrats

(23/01/2002)

- 1.1 Sous réserve des paragraphes A1.4 and A1.5, les documents constituant le contrat passé entre Sa Majesté et l’Entrepreneur (ci-après appelé le Contrat) sont:
 - 1.1.1 les présents Articles de convention;
 - 1.1.2 les documents intitulés “Plans et devis” et annexés aux présentes sous la cote “A”;
 - 1.1.3 le document intitulé “Modalités de paiement” et annexé aux présentes sous la cote “B”;
 - 1.1.4 le document intitulé, “Conditions générales” et annexé aux présentes sous la cote “C”;
 - 1.1.5 le document intitulé, “Conditions de travail” et annexé aux présentes sous la cote “D”;
 - 1.1.6 le document intitulé, “Conditions d’assurance” et annexé aux présentes sous la cote “E”;
 - 1.1.7 le document intitulé, “Conditions de garantie du contract” et annexé aux présentes sous la cote “F”; et
 - 1.1.8 toute modification au Contract en accord avec le Conditions générales.
 - 1.1.9 le document intitulé “Échelles de juste salaire pour les contrats fédéraux de construction”, désigné dans le présent document par l’appellation “Échelles de justes salaires”.

Articles de Convention

1.2 Le Conseil désigne de **SAGI** du CNRC, du gouvernement du Canada, Ingénieur aux fins du Contrat et à toute fin, y compris aux fins accessoires, l'adresse de l'Ingénieur est réputée être:

1.3 Dans le Contrat

1.3.1 "Entente à prix fixe" désigne la partie du Contrat où il est stipulé qu'un paiement global sera fait en contrepartie de l'exécution des travaux auxquels elle se rapporte; et

1.3.2 "Entente à prix unitaire" désigne la partie du Contrat où il est stipulé que le produit d'un prix multiplié par un nombre d'unité de mesurage d'une catégorie sera versé à titre de paiement pour l'exécution des travaux visés par cette entente.

1.4 Toute dispositions du Contrat qui s'applique expressément et seulement à une Entente à prix unitaire ne s'applique à aucune partie des travaux qui relève de l' Entente à prix fixe.

1.5 Toute dispositions du Contrat qui s'applique expressément et seulement à une Entente à prix fixe ne s'applique à aucune partie des travaux qui relève de l' Entente à prix Unitaire.

A2 Description des travaux et date d'achèvement (23/01/2002)

2.1 Entre la date des présentes Articles de convention et le jour de , l'Entrepreneur exécute, avec soin et selon le règles de l'art, à l'endroit et de la manière indiquée, les travaux suivants :

plus particulièrement décrits dans les Plans et devis, incluant les addenda no.

Articles de Convention

A3 Prix du marché

(23/01/2002)

- 3.1 Sous réserve de toute addition, soustraction, déduction, réduction ou compensation prévue en vertu du Contrat, Sa Majesté, aux dates et de la manière énoncées ou mentionnées dans les Modalités de paiement, paie à l'Entrepreneur:
- 3.1.1 la somme de \$ (TPS/TVH en sus), en considération et l'exécution des travaux ou des parties de travaux à laquelle s'applique l'Entente à prix fixe, et
- 3.1.2 une somme égale à l'ensemble des produits du nombre d'unités de mesurage de chaque catégorie de travail, d'outillage ou de matériaux indiqué dans le Certificat définitif de mesurage mentionné ou paragraphe CG44.8, ce nombre d'unités étant multiplié selon le cas par le prix de chaque unité indiquée dans le Tableau des prix unitaires relativement à l'exécution des travaux ou des parties de travaux qui ont fait l'objet d'une Entente à prix unitaire.
- 3.2 Pour le gouverne de l' Entrepreneur et des personnes chargées de l'exécution du Contrat au nom de sa Majesté, mais sans toutefois comporter une garantie ou un engagement de quelque nature de la part de l'une ou l'autre partie, il est estimé que la somme totale payable par Sa Majesté à l'Entrepreneur pour la partie des travaux qui a fait l'objet d'une Entente à prix unitaire, sera d'environ N/A \$
- 3.3 L'alinéa A3.1.1 ne s'applique qu'à une Entente à prix fixe.
- 3.4 L'alinéa A3.1.2 et le paragraphe A3.2 ne s'appliquent qu'à une Entente à prix unitaire.

A4 Adresse de L'Entrepreneur

(23/01/2002)

- 4.1 Aux fins du Contrat, y compris les fins accessoires, l'adresse de l'Entrepreneur est réputé être:

Articles de Convention

A5 Tableau des prix unitaires

(23/01/2002)

5.1 Il est convenu entre Sa Majesté et l'Entrepreneur que le tableau ci-après est le Tableau des prix unitaires pour le Contrat:

Colonne 1 Postes	Colonne 2 Catégorie de travail outillage ou de matériaux	Colonne 3 Unité de mesurage	Colonne 4 Quantité totale estimative	Colonne 5 Prix unitaire	Colonne 6 Prix total estimatif
		N/A			

5.2 Le Tableau des prix unitaires présenté au paragraphe A5.1 décrit la partie des travaux visée par l'Entente à prix unitaire.

5.3 La partie des travaux qui n'est pas décrite dans le Tableau des prix unitaires mentionné au paragraphe A5.2 est la partie des travaux visée par l'Entente à prix fixe.

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1. DESCRIPTION DES TRAVAUX

- .1 Les travaux à être effectués au cours de ce contrat couvrent le réaménagement des pièces 317 et 319 du bâtiment M-19 du Conseil National de Recherches du Canada

2. DESSINS

Les dessins suivants illustrent les travaux exécutés et font partie du présent contrat.

.1	COVER SHEET	5463-A00
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.3	ELEVATIONS ROOM 318	5463-A02
.4	PART SECOND FLOOR FINISHES PLAN	5463-A03
.5	STRUCTURAL FLOOR PLAN, ELEVATIONS & SECTIONS	5463-S01
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.7	HVAC - NEW WORK	5463-M02
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.9	HVAC - DEMOLITION AND NEW WORK	5463-M04
10.	NEW - LIGHTING, POWER & COMMUNICATION, COMMUNICATION ZONE CONDUIT	5463-E01

3. ACHÈVEMENT DES TRAVAUX

- .1 Terminer tous les travaux dans les six (6) semaines qui suivent la réception de l'avis d'acceptation de la soumission.

4. GÉNÉRALITÉS

- .1 Sans objet en français.
.2 Fournir les items mentionnés dans les dessins ou dans les spécifications

5. MATÉRIEL ET PRODUITS SPÉCIFIÉS, DÉSIGNÉS ACCEPTABLES OU SUBSTITUTS

- .1 Les produits et le matériel spécifiés dans les dessins ou les devis ont été sélectionnés dans le but d'établir des normes de rendement et de qualité. Dans la plupart des cas, lorsque l'on précise la marque de commerce et le numéro de modèle de tout produit ou matériel, on indique aussi les noms d'autres fabricants qui seraient acceptables. Les entrepreneurs peuvent calculer le montant de leur soumission en se fondant sur les prix des produits et du matériel fournis par n'importe quel des fabricants désignés comme étant des fournisseurs acceptables de produits ou de matériel particuliers.
- .2 En plus des fabricants spécifiés ou désignés comme étant acceptables, vous pouvez demander au représentant ministériel d'approuver d'autres fabricants, produits ou matériel. Pour faire approuver un produit en tant que substitut, vous devez remettre une

demande par écrit au représentant ministériel au cours de la période fixée pour soumissionner, au plus tard dix (10) jours ouvrables avant la clôture de l'appel d'offres.

- .3 Vous devez attester par écrit que le substitut répond à toutes les exigences relatives aux dimensions, à la capacité, au rendement et à la qualité du matériel ou des produits spécifiés. En outre, il est entendu que l'entrepreneur assume tous les coûts qui sont reliés à l'acceptation des substituts proposés, ou qui en résultent.
- .4 L'approbation des substituts sera communiquée sous forme d'un Addendum aux documents de soumission.
- .5 Nous n'examinerons pas les demandes d'approbation d'autres fabricants, produits ou matériel qui sont incomplets et impossibles à évaluer ou qui sont soumises moins de dix (10) jours avant la clôture de l'appel d'offres.

6. NORMES MINIMALES

- .1 Se conformer aux exigences des normes minimales acceptables des divers codes fédéraux, provinciaux et municipaux pertinents tels le Code national du bâtiment, le Code national de prévention des incendies, le Code canadien de la plomberie, le Code canadien de l'électricité, le Code canadien de la sécurité sur les chantiers de construction et la Loi provinciale sur la sécurité dans la construction, ou les dépasser.
- .2 Effectuer les travaux conformément aux normes et codes dont il est fait mention, en vigueur ou révisés à la date de publication du présent devis.

7. SYSTÈME D'INFORMATION SUR LES MATIÈRES DANGEREUSES UTILISÉES AU TRAVAIL (SIMDUT)

- .1 L'entrepreneur doit se conformer aux lois fédérales et provinciales portant sur le SIMDUT. Les responsabilités de l'entrepreneur comprennent les tâches suivantes, sans s'y limiter :
 - .1 S'assurer de l'étiquetage acceptable de tout produit contrôlé introduit sur les lieux des travaux par l'entrepreneur lui-même ou un sous-traitant, ou l'un de leurs fournisseurs;
 - .2 Mettre à la disposition des travailleurs et du représentant ministériel des fiches techniques « santé - sécurité » (FTSS) portant sur ces produits contrôlés;
 - .3 Former ses propres ouvriers pour le SIMDUT et les produits contrôlés présents au chantier;
 - .4 Informer les autres entrepreneurs, les sous-traitants, le représentant ministériel, les visiteurs autorisés, ainsi que les représentants des organismes externes d'inspection, de la présence et de l'utilisation de ces produits sur les lieux des travaux.
 - .5 Le contremaître ou le surveillant des travaux doit pouvoir démontrer au représentant ministériel qu'il a reçu une formation portant sur le SIMDUT et qu'il est au courant des exigences de ce système. Le représentant ministériel peut exiger le remplacement de cette personne, si celle-ci ne satisfait pas à l'exigence susmentionnée ou si le SIMDUT n'est pas mis en œuvre de façon acceptable.

8. PRESCRIPTIONS DU RÈGLEMENT 208, SECTION 18(A)

- .1 Tel que prescrit par le Règlement 208 de la Loi sur la santé et la sécurité au travail du Ministère du Travail de l'Ontario, nous vous avisons de la présence possible sur les lieux de travail visés par le présent contrat des matières désignées suivantes:
 - .1 Acrylonitrile, Arsenique, Amiante, Benzène, Oxyde d'éthylène, Isocyanotes, Plomb, Mercure, Silice, Chlorure de vinyle
 - .1 L'entrepreneur général a la responsabilité de s'assurer que tous les éventuels sous-traitants ont reçu une copie de liste des matières désignées qui peuvent être présentes sur le chantier
 - .2 L'entrepreneur est donc averti de prendre les mesures de précaution suivantes lorsqu'il est en présence des matières nommées plus haut:

9. VENTILATION DES COÛTS

- .1 Avant de demander le premier paiement d'acompte, soumettre à l'approbation du représentant ministériel une ventilation des coûts.
- .2 Une fois approuvée, utiliser la ventilation des coûts comme base pour la soumission de toute autre demande.
- .3 Avant de rédiger et de soumettre une demande sous sa forme définitive, obtenir le consentement verbal du représentant ministériel quant au montant de cette demande.

10. SOUS-TRAITANTS

- .1 Dans les 72 heures qui suivent l'acceptation de la soumission, soumettre à l'étude du représentant ministériel une liste complète des sous-traitants.

11. INSIGNES D'IDENTIFICATION ET ENQUÊTES DE SÉCURITÉ DU PERSONNEL

- .1 Toute personne employée par l'Entrepreneur ou par un de ses sous-traitants et présents sur le chantier doit rencontrer les exigences d'une enquête de sécurité en accord avec la section intitulée Instructions Spéciales aux Soumissionnaires.
- .2 Toutes ces personnes doivent porter et garder visible une insigne d'identification émise par le Bureau de la sécurité du CNRC

12. HEURES DE TRAVAIL ET EXIGENCES D'ESCORTE

- .1 Les heures normales de travail au CNRC sont de 8h00 à 16h30, du lundi au vendredi inclusivement, sauf les congés fériés.
- .2 En tout autre temps, des laissez-passer spéciaux sont nécessaires pour avoir accès au chantier.
- .3 Obtenir la permission du représentant ministériel d'exécuter des tâches particulières avant de planifier tout travail après les heures normales de travail.
- .4 Après les heures normales de travail, il se peut qu'une escorte soit nécessaire. Défrayer les coûts de cette escorte si le représentant ministériel le demande.

13. CALENDRIER DES TRAVAUX

- .1 L'Entrepreneur doit soumettre un calendrier détaillé des travaux, indiquant les dates du début et de la fin des diverses étapes des travaux et le mettre à jour. Il doit remettre ce calendrier au représentant ministériel au plus tard deux semaines après l'adjudication du contrat et avant d'entreprendre tout travail au chantier.
- .2 Informer le représentant ministériel par écrit de toute modification apportée au calendrier,
- .3 Dix (10) jours avant la date d'achèvement prévue, planifier de faire une inspection provisoire avec le représentant ministériel.

14. RÉUNIONS

- .1 Tenir régulièrement des réunions aux heures et aux endroits approuvés par le représentant ministériel.
- .2 Aviser toutes les parties intéressées des réunions pour assurer une bonne coordination des travaux.
- .3 Le représentant ministériel déterminera les heures de réunions et assume la responsabilité d'enregistrer et distribuer le procès verbal.

15. DESSINS D'ATELIER

- .1 Soumettre au représentant ministériel, aux fins de vérification, les dessins d'atelier, la documentation et les échantillons prescrit deux (2) semaines après l'adjudication du contrat.
- .2 Soumettre au représentant ministériel aux fins de vérification, une liste complète de tous les dessins d'atelier, la documentation et les échantillons prescrits et une confirmation écrite des dates de livraison correspondantes dans l'intérieur d'une (1) semaine, suite à la date d'approbation des dessins d'atelier, de la documentation et des échantillons. Cette liste devra être mise à jour sur une base de deux (2) semaines et n'importe quels changements à la liste devront être immédiatement notifiés par écrit au représentant ministériel.
- .3 Examiner les dessins d'atelier, la documentation et les échantillons avant de les soumettre.
- .4 Sauf avis contraire, soumettre 5 copies de tous les dessins d'atelier, de la documentation, ainsi que des échantillons pour vérification.
- .5 Demeurer responsable des erreurs et des omissions apparaissant dans les dessins d'atelier et la documentation et s'assurer qu'ils sont conformes aux documents contractuels même s'ils sont revus par le représentant ministériel.

16. ÉCHANTILLONS ET MAQUETTES

- .1 Soumettre des échantillons aux dimensions et quantités prescrites.
- .2 Si la couleur, le motif ou la texture sont des facteurs spécifiés, soumettre tout un éventail d'échantillons.
- .3 Monter des modèles et des maquettes au chantier, aux endroits qui conviennent le représentant ministériel.

- .4 Tout travail terminé est vérifié sur place d'après les modèles ou maquettes approuvés qui servent de normes pour la façon et les matériaux.

17. MATÉRIAUX ET MISE EN ŒUVRE

- .1 Pour le présent projet, n'utiliser que des matériaux neufs, sauf si noté autrement.
- .2 Seuls les travaux de première classe seront acceptés, non seulement en ce qui a trait à la sécurité, l'efficacité et la durabilité, mais aussi à l'exactitude du détail et au bon rendement.

18. OUVRAGES ET MATÉRIAUX FOURNIS PAR LE PROPRIÉTAIRE

- .1 Les ouvrages et matériaux non inclus dans ce contrat sont décrits sur les dessins et dans le devis.
- .2 Tous les matériaux retournés au Propriétaire doivent être transportés à un lieu d'entreposage désigné par le représentant ministériel.
- .3 Sauf indication contraire, prendre possession des matériaux fournis par le Propriétaire à leur lieu d'entreposage et assurer leur transport.
- .4 Responsabilités de l'Entrepreneur :
 - .1 les décharger à pied d'œuvre;
 - .2 en faire aussitôt l'inspection et signaler tout article endommagé ou défectueux;
 - .3 par écrit, informer le représentant ministériel des articles qui sont reçus en bon état;
 - .4 les manutentionner à pied d'œuvre, ce qui comprend leur déballage et leur entreposage;
 - .5 Réparer ou remplacer les articles endommagés au chantier.
 - .6 Installer et raccorder les produits finis conformément aux prescriptions.

19. VOIES D'ACCÈS

- .1 Prendre les dispositions nécessaires avec le représentant ministériel avant de commencer les travaux ou avant de transporter des matériaux et du matériel au chantier.
- .2 Obtenir l'approbation du représentant ministériel quant aux moyens d'accès normaux au chantier pendant la période de construction.
- .3 Obtenir l'approbation du représentant ministériel avant de suspendre temporairement les travaux sur le chantier; avant de retourner au chantier et avant de quitter le chantier à la fin des travaux.
- .4 Obtenir l'approbation du représentant ministériel avant de suspendre temporairement les travaux sur le chantier; avant de retourner au chantier et avant de quitter le chantier à la fin des travaux.
- .5 Aménager et entretenir des routes provisoires pendant les travaux.
- .6 Fournir le déneigement et l'enlèvement de la neige au besoin pendant la durée du contrat

- .7 L'Entrepreneur doit réparer et nettoyer les routes qu'il a dû utiliser au cours des travaux.

20. UTILISATION DU CHANTIER

- .1 Limiter les travaux sur le chantier aux secteurs approuvés par le représentant ministériel au moment de la soumission.
- .2 Tous matériel, structures, abris, etc. provisoires doivent se trouver dans les secteurs désignés.
- .3 Limiter le stationnement aux secteurs désignés.

21. ACCEPTATION DU CHANTIER

- .1 Avant d'entreprendre les travaux, l'Entrepreneur doit visiter le chantier et, en compagnie du représentant ministériel, revoir toutes les conditions qui pourraient toucher ses travaux.
- .2 Le début des travaux signifiera l'acceptation des conditions existantes.

22. BUREAU ET TÉLÉPHONE AU CHANTIER

- .1 L'Entrepreneur devra ériger, à ses frais, un bureau temporaire au chantier.
- .2 Au besoin, installer un téléphone et en assurer l'entretien.
- .3 Il est interdit d'utiliser les téléphones du CNRC, sauf en cas d'urgence.

23. INSTALLATIONS SANITAIRES

- .1 Obtenir la permission du représentant ministériel pour utiliser les installations sanitaires existantes ou fournir ses propres installations, et en assumer tous les frais

24. SERVICES PROVISOIRES

- .1 L'Entrepreneur pourra bénéficier d'une source provisoire d'électricité à pied d'œuvre. Il devra fournir, sans frais, tous les raccords et matériaux nécessaires pour assurer ledit service au chantier.
- .2 Fournir et installer tous les centres de distributions, disjoncteurs, conduits, câblage, commutateur de déconnexion, transformateurs nécessaires à partir de la source d'électricité.
- .3 Il n'est permis d'utiliser le courant que pour les outils électriques, l'éclairage, les commandes, les moteurs, et non pas pour chauffer.
- .4 Sur demande, il sera possible de se raccorder provisoirement au réseau de distribution d'eau.
- .5 Assumer tous les frais pour amener l'eau aux endroits nécessaires.
- .6 Se conformer aux exigences du CNRC lors du raccordement aux réseaux existants, conformément aux articles "Coopération" et "Interruptions des services" de cette section".

25. DEVIS DESCRIPTIF, BULLETINS, DESSINS D'ARCHIVES

- .1 L'Entrepreneur doit conserver à pied d'œuvre une (1) copie à jour et en bon état de tous les devis, dessins et bulletins relatifs aux travaux; le représentant ministériel ou ses représentants doivent pouvoir les consulter en tout temps.
- .2 L'Entrepreneur doit annoter au moins une (1) copie du devis et des dessins pour y indiquer tous les travaux tels qu'ils ont été exécutés. Il doit la remettre au représentant ministériel avec la Demande de paiement pour le Certificat définitif d'achèvement des travaux.

26. COOPÉRATION

- .1 Coopérer avec le personnel du CNRC pour que les travaux de recherche courants soient interrompus le moins possible.
- .2 Faire, à l'avance, un calendrier de tous les travaux qui pourraient interrompre le travail normal exécuté dans l'édifice.
- .3 Faire approuver le calendrier par le représentant ministériel.
- .4 Donner un préavis écrit de 72 heures au représentant ministériel avant toute interruption projetée des installations, des secteurs, des corridors, des services mécaniques ou électriques, et attendre son autorisation.

27. MESURES DE PROTECTION ET ÉCRITEAUX AVERTISSEMENT

- .1 Fournir et installer tous les matériaux nécessaires pour protéger le matériel existant.
- .2 Ériger des écrans anti-poussière pour éviter que la poussière et les débris ne se répandent en dehors des limites des travaux.
- .3 Protéger contre la poussière le matériel et le mobilier avec des bâches et coller ces dernières au plancher, au moyen de ruban adhésif, pour que la poussière ne s'infilte pas.
- .4 Réparer ou remplacer, gratuitement et à la satisfaction du représentant ministériel, tout bien du Propriétaire endommagé pendant les travaux.
- .5 Protéger les édifices, les routes, les pelouses, les services, etc. contre tout dommage qui pourrait survenir suite à l'exécution des présents travaux.
- .6 Planifier et coordonner les travaux pour que l'eau, la poussière, etc. ne s'infilte pas dans les édifices.
- .7 Fermer toutes les portes, fenêtres, etc. qui pourraient permettre le passage de la poussière, de vapeurs, etc. dans les autres secteurs de l'édifice.
- .8 Fermer le secteur des travaux à la fin de chaque journée de travail et être responsable des lieux.
- .9 Fournir et installer en permanence des barrières de sécurité appropriées autour du chantier pour éviter que le public et le personnel du CNRC soient blessés pendant l'exécution des travaux.
- .10 Poser des écriteaux d'avertissement pour toutes les situations où il pourrait se produire des blessures (ex : Casque protecteurs obligatoires, danger, travaux, etc.) ou lorsque le représentant ministériel le demande.

- .11 Fournir et installer des abris provisoires au-dessus des entrées et des sorties de l'édifice pour assurer la protection des piétons. Tous ces abris doivent pouvoir résister aux intempéries et à la chute de débris

28. BILINGUISME

- .1 Tous les écriteaux, avis, etc. doivent être bilingues.
- .2 Toute identification de services exigée aux termes du présent contrat.

29. DISPOSITION DES OUVRAGES

- .1 Les localisations des équipements, appareils, raccords et ouvertures tel que spécifiées ou indiquées aux dessins doivent être considérées comme approximatives.
- .2 Situer les équipements, appareils et systèmes de distributions de façon à minimiser les interférences et maximiser l'espace utilisable et en accord avec les instructions du manufacturier pour un accès et entretien sécuritaire
- .3 Engager une personne compétente pour agencer les travaux selon les documents contractuels

30. ÉCARTS ET INTERFÉRENCES

- .1 Avant de débiter les travaux, examiner les dessins et le devis. Signaler aussitôt au représentant ministériel tout écart, défaut, omission ou interférence qui touchent les travaux.
- .2 Si, au cours des travaux, l'Entrepreneur trouve que les plans ne reflètent pas la réalité, il lui incombe de le signaler immédiatement par écrit au représentant ministériel, lequel doit rapidement vérifier les allégations.
- .3 Tout travail exécuté après cette découverte, jusqu'à ce qu'il soit autorisé, doit être fait aux risques de l'Entrepreneur.
- .4 Si des obstacles ou interférences mineures sont décelés en cours d'exécution et qu'ils n'avaient pas été signalés sur la soumission originale ou sur les plans et le devis, fournir et installer des doubles coudes ou des coudes ou modifier le tracé des services pour qu'il soit appropriés aux conditions du chantier, et ce sans frais supplémentaire.
- .5 Prendre les dispositions pour que tous les travaux ne gênent d'aucune façon l'exécution des autres travaux.

31. INSTRUCTIONS DU FABRICANT

- .1 Sauf indications contraires, se conformer aux plus récentes instructions écrites du fabricant concernant les matériaux et le matériel à utiliser et les méthodes de mise en place.
- .2 Aviser le représentant ministériel par écrit de toute divergence entre le présent devis et les instructions du fabricant; le représentant ministériel déterminera alors quel document a priorité.

32. CHAUFFAGE PROVISOIRE ET VENTILATION

- .1 Assumer les frais de la ventilation et du chauffage provisoire utilisés pendant la construction, y compris les frais d'installation, de combustible, d'exploitation, d'entretien et d'enlèvement du matériel.
- .2 Sauf si le représentant ministériel l'a autorisé, il est interdit d'utiliser des appareils de chauffage autonomes répandant des émanations dans les zones de travail.
- .3 Fournir et installer le matériel provisoire de chauffage et de ventilation requis dans les endroits fermés afin de:
 - .1 faciliter l'exécution des travaux.
 - .2 protéger les ouvrages et les matériaux contre l'humidité et le froid.
 - .3 réduire la condensation de l'humidité sur les surfaces à un niveau acceptable.
 - .4 assurer les niveaux de température ambiante et d'humidité indispensables pour l'entreposage, l'installation et la période de séchage requis des matériaux.
 - .5 assurer une ventilation adéquate afin de répondre aux exigences de santé publique concernant la sécurité dans les zones de travail.
- .4 Maintenir une température d'au moins 10o C (50oF) aux endroits spécifiés, partir du début des travaux de finition jusqu'au moment de l'acceptation du bâtiment par le représentant ministériel.
 - .1 Maintenir la température ambiante et l'humidité aux niveaux nécessaires pour assurer le bien être du personnel du CNRC.
- .5 Prendre les mesures nécessaires pour empêcher les accumulations dangereuses de poussières, fumées, buées, vapeurs et émanations, dans les zones occupées pendant les travaux de construction, y compris aussi les aires d'entreposage et les installations sanitaires.
 - .1 Évacuer les substances dangereuses de sorte que la santé des occupants ne soit pas mise en danger.
- .6 Assurer une surveillance constante et rigoureuse du fonctionnement du matériel de chauffage et de ventilation.
 - .1 Faire respecter les normes et les codes pertinents.
 - .2 Se conformer aux instructions de l'Agent de prévention des incendies du CNRC, ce qui comprend la désignation, sur demande, de gardiens de sécurité- incendie à temps complet.
 - .3 Faire respecter les normes de sécurité.
 - .4 Doter les appareils de combustion autonomes de mises à l'air libre vers l'extérieur.
- .7 Rédiger les soumissions en supposant que les installations et le matériel neufs ou existants ne pourront être utilisés pour le chauffage et la ventilation provisoire.
- .8 Une fois le contrat adjudgé, le représentant ministériel peut autoriser l'utilisation de l'installation permanente s'il peut y avoir entente sur ce qui suit:
 - .1 conditions d'utilisation, matériel spécial, protection et entretien, remplacement des filtres, etc.;

- .2 méthodes pour s'assurer que le caloporteur ne sera pas perdu et, dans le cas de la vapeur, entente sur ce qu'il adviendra du condensateur;
- .3 réduction du prix du contrat (s'il doit être débit);
- .4 prescriptions pertinentes aux garanties du matériel.

33. INTERRUPTIONS DES SERVICES

- .1 Lorsque les travaux impliquent le raccord a des services existants, exécuter les travaux en temps et manière pré-agrées avec le représentant ministériel et autres autorités ayant juridiction avec le minimum de perturbations au personnel du CNRC, a la circulation véhiculaire et de temps d'interruption du service. L'entrepreneur ne doit en aucun cas opérer les équipements du CNRC.
- .2 Avant de commencer les travaux, établir la localisation et l'étendue des lignes de services dans l'espace de travail et ou affectés par les travaux et aviser le représentant ministériel des constatations.
- .3 Fournir une cédule et obtenir l'approbation du représentant ministériel pour toute interruption ou fermeture de services actif et allouer un préavis de 72 heures.
- .4 Aviser le représentant ministériel immédiatement suivant la rencontre de services inconnus et confirmer la découverte par écrit
- .5 Afin de minimiser les interruptions, prévoir des déviations, des ponts, des sources d'alimentation de rechange, etc., au besoin
- .6 Protéger les services existants comme il se doit et effectuer aussitôt toutes les réparations nécessaires si des dommages surviennent.
- .7 Enlever tous les lignes de services abandonnés tel qu'indiqués dans les documents contractuels et tel qu'approuvé par le représentant ministériel, boucher et ou autrement sceller aux points de coupure. Noter et fournir une copie au représentant ministériel de la localisation de toutes les lignes de services maintenues, déroutées et ou abandonnées

34. DÉCOUPAGE ET RAPIÉÇAGE

- .1 Découper les surfaces existantes de façon à ce que les ouvrages s'agencent correctement entre eux.
- .2 Supprimer tous les articles indiqués ou prescrits.
- .3 Rapiécer et réparer, à la satisfaction du représentant ministériel, les surfaces qui ont été modifiées, découpées ou endommagées, avec des matériaux identiques.
- .4 Là où des nouveaux tuyaux passent à travers des travaux existants, percer une ouverture. La dimension de l'ouverture doit laisser un jeu de 12mm (1/2") autour des tuyaux ou de l'isolation de la tuyauterie. Ne pas percer, ni couper aucune surface sans l'approbation de le représentant ministériel.
- .5 Obtenir l'approbation écrite du représentant ministériel avant de percer des ouvertures dans les pièces de charpente neuves ou existantes.
- .6 Calfeutrer toutes les ouvertures où des câbles, conduits ou tuyaux passent à travers les murs avec un calfeutrante acoustique conforme à CAN/CGSB 19.21-M87.

- .7 Là où des câbles, conduits ou tuyaux passent à travers des murs ou des planchers coupe-feu, remplir l'espace avec des fibres de verre comprimées et calfeutrer avec un calfeutrant en accord avec CAN/CGSB-19.13 et NBC 3.1.7.

35. DISPOSITIFS DE FIXATION

- .1 Sauf autorisation expresse du représentant ministériel, il est interdit d'utiliser des pistolets à charge explosive.
- .2 Se conformer aux exigences de la norme ACNOR A-166, Pistolets d'ancrage à charge explosive.
- .3 Obtenir la permission du représentant ministériel avant d'utiliser tout genre d'outils percussion.

36. SURCHARGE

- .1 S'assurer qu'aucune partie de l'ouvrage ou de l'édifice ne supporte une charge susceptible de compromettre sa sécurité ou de causer une déformation permanente ou un dommage de structure.

37. DRAINAGE

- .1 Assurer le drainage et le pompage temporaires, selon les besoins, afin de garder les excavations et le chantier propres.

38. ENCEINTES ET FERMETURES DE LA CHARPENTE

- .1 Ériger et entretenir toutes les enceintes temporaires nécessaires pour protéger les fondations, le sous-sol, le béton, la maçonnerie, etc. contre le gel ou les dommages.
- .2 Ne pas les enlever tant que tout danger de dommage n'est pas écarté et tant que la cure n'est pas terminée.
- .3 Munir les ouvertures extérieures de fermetures protectrices provisoires à l'épreuve des intempéries, jusqu'à ce que les châssis, les vitres et les portes extérieures soient installés en permanence.
- .4 Fournir et installer des fermetures avec verrou, afin d'assurer la sécurité des installations du CNRC, et en être responsable.
- .5 Sur demande, remettre des clés au personnel de sécurité du CNRC.
- .6 Disposer les ouvrages avec soin et avec précision. Vérifier toutes les dimensions et en être responsable. Situer les points de repère généraux et prendre les mesures nécessaires pour empêcher leur déplacement.
- .7 Pendant toute la durée des travaux, voir à toujours être au courant des conditions du chantier et des travaux exécutés par tous les autres gens de métier, engagés dans le présent projet.
- .8 Sauf indication contraire, dissimuler tous les services, tuyauterie, câblage, conduits, etc. dans les planchers, les murs ou les plafonds.

39. ENTREPOSAGE

- .1 Pour ne pas que les outils, matériaux, etc. soient endommagés ou volés, prévoir un entrepôt et en être responsable.
- .2 Il est interdit d'entreposer des produits inflammables ou explosifs sur le chantier à moins que l'Agent de prévention des incendies du CNRC l'autorise.

40. EXAMEN GÉNÉRAL

- .1 Même si le représentant ministériel revoit périodiquement les travaux de l'Entrepreneur, ceci ne dégage pas l'Entrepreneur de sa responsabilité d'exécuter les travaux conformément aux documents contractuels. L'Entrepreneur doit effectuer son propre contrôle de la qualité pour vérifier si ses travaux sont conformes aux documents contractuels.
- .2 Informer le représentant ministériel de tout obstacles à la bonne conduite des travaux et obtenir son approbation pour la relocalisation

41. INSPECTION DES SERVICES ENFOUIS OU DISSIMULÉS

- .1 Avant de dissimuler tout service installé, s'assurer que tous les organismes d'inspection intéressés, y compris le CNRC, ont inspecté les ouvrages et ont assisté à tous les essais. Dans le cas contraire, l'Entrepreneur peut avoir à les découvrir à ses propres frais.

42. ESSAIS

- .1 A l'achèvement des travaux, ou sur demande du représentant ministériel et (ou) des inspecteurs des organismes locaux en cours d'exécution, et avant que tout service soit couverts et que le rinçage soit terminé, faire l'essai de toutes les installations en présence du représentant ministériel.
- .2 Obtenir tous les certificats d'acceptation ou tous les résultats d'essais des organismes compétents et les remettre le représentant ministériel. Dans le cas contraire, le projet ne sera pas complet.

43. OCCUPATION PARTIELLE

- .1 Le CNRC peut demander une occupation partielle de l'installation si les travaux se poursuivent au-delà de la date d'achèvement prévue.
- .2 Ne pas limiter l'accès à l'édifice, routes et services.
- .3 Ne pas encombrer inutilement le chantier de matériaux ou de matériel.

44. ÉVACUATION DES DÉCHETS

- .1 Évacuer, en toute sécurité hors des terrains du CNRC, tous les déchets, y compris les produits volatils; voir article "Sécurité-incendie et "Sécurité générale", section 01000.

45. NETTOYAGE PENDANT LA CONSTRUCTION

- .1 Sur une base quotidienne, garder les lieux et le secteur adjacent au campus, y compris les toits, exempts de débris et de déchets.

- .2 Apporter sur les lieux des conteneurs destinés à la cueillette des déchets et des débris.

46. NETTOYAGE FINAL

- .1 A la fin des travaux, effectuer le nettoyage final à la satisfaction du représentant ministériel.
- .2 Nettoyer toutes les nouvelles surfaces, les luminaires et les surfaces existantes touchés par les présents travaux, remplacer les filtres, etc.
- .3 Nettoyer tous les couvre-planchers souples et les préparer à recevoir le fini protecteur qui sera appliqué par le personnel du CNRC.

47. GARANTIE

- .1 Voir les conditions générales C, section GC32.
- .2 Veiller à ce que toutes les garanties soient adressées au nom de l'entrepreneur et du Conseil national de recherches du Canada.

48. MANUELS D'ENTRETIEN

- .1 À la fin des travaux et avant la décharge de garantie, soumettre deux (2) exemplaires bilingues des manuels d'entretien ou deux exemplaires de chacune des versions anglaises et françaises ainsi qu'une copie électronique de la même information.
- .2 Bien relier les données dans des cahiers à couverture rigide pour feuilles volantes.
- .3 Les manuels doivent renfermer les instructions d'exploitation et d'entretien, les garanties, les dessins d'atelier, la documentation technique, etc. touchant les matériaux et les appareils fournis aux termes du présent contrat.

FIN DE SECTION

1. EXIGENCES GÉNÉRALES DE SÉCURITÉ EN CONSTRUCTION

- .1 L'Entrepreneur doit prendre toutes les mesures nécessaires lors de l'exécution du contrat pour protéger le personnel (travailleurs, les visiteurs, le public général, etc...) et la propriété immobilière.
- .2 L'Entrepreneur est le seul responsable pour la sécurité de ses employés, des employés de ses sous-traitants et pour l'initiation, le maintien et la supervision des précautions, programmes et procédures de sécurité en rapport avec l'exécution des travaux.
- .3 L'Entrepreneur doit se conformer à la réglementation et les codes de sécurité Fédéraux, Provinciaux et municipaux et ainsi que la Loi sur la santé et la sécurité au travail (Ontario) à la Commission de la sécurité professionnelle et de l'assurance contre les accidents du travail (CSPAAT). Advenant des conflits entre les dispositions de la législation ou des codes, les dispositions les plus sévères s'appliqueront.
- .4 La révision périodique du travail de l'Entrepreneur par le représentant ministériel en utilisant les critères des documents contractuels ne relève pas l'Entrepreneur de ses responsabilités vis-à-vis la sécurité lors de l'accomplissement des travaux selon les documents contractuels. L'Entrepreneur doit consulter avec le représentant ministériel pour s'assurer que cette responsabilité est acquitte
- .5 L'Entrepreneur doit s'assurer que seulement des personnes compétentes puissent avoir accès et travailler sur le chantier. Tout au cours du contrat toute personne qui n'observe pas ou n'applique pas les règlements de sécurité pourra être renvoyée du chantier.
- .6 Tous les équipements doivent être sécuritaires en bon état de fonctionnement et appropriés pour la tâche.
- .7 Suivant une évaluation du projet et des risques spécifiques au site des travaux, L'Entrepreneur doit développer un Plan de sécurité spécifique au Site
 - .1 Fournir une affiche montée dans un endroit visible du site du projet contenant les informations suivantes :
 - .1 Avis de Projet
 - .2 Politique de Sécurité Spécifique au site
 - .3 Une copie de Loi sur la santé et la sécurité au travail (Ontario)
 - .4 Un schéma du bâtiment indiquant toutes les sorties d'urgence
 - .5 Les procédures en cas d'urgence spécifiques au bâtiment.
 - .6 Une liste de contacts pour le CNRC, l'Entrepreneur et tous les sous-traitants impliqués
 - .7 Toutes fiches signalétiques SIMDUT pertinentes
 - .8 Les numéros téléphoniques d'urgence du CNRC
- .8 L'Entrepreneur doit fournir du personnel compétent pour appliquer son programme de sécurité ainsi que tout article applicable de la Loi sur la santé et la sécurité au travail et pour s'assurer que ces directives sont suivies

- .9 L'Entrepreneur doit orienter tous ces employés ainsi que ceux des sous-traitants sous sa juridiction
- .10 Le représentant ministériel exercera une surveillance pour s'assurer que les exigences de sécurité sont rencontrées, que les documents pertinents sont bien remplis et conservés. Le contrat pourra être annulé et l'Entrepreneur ou ses sous-traitants pourront être renvoyés du chantier advenant le non-respect répétitif des standards de sécurité
- .11 L'Entrepreneur devra rapporter tout accident ou incident qui résulte de l'exécution des travaux par l'Entrepreneur et impliquant l'Entrepreneur, le personnel du CNRC ou le public au représentant ministériel et aux autorités ayant juridiction.
- .12 Si pour effectuer ses travaux, l'entrée dans un laboratoire est requise, l'Entrepreneur devra être fournir une session d'orientation concernant la sécurité et les procédures spécifiques à ce laboratoire à ses employés ainsi qu'à ceux de ses sous-traitants suivant les instructions fournies par le responsable du laboratoire ou le représentant ministériel.

2. EXIGENCES DE SÉCURITÉ INCENDIE

.1 Autorité

1. Le Commissaire des incendies du Canada (CIC) est l'autorité en matière de sécurité incendie au CNRC.
2. Aux fins du présent document, le représentant ministériel est le représentant de la CNRC en charge du projet.
3. Respectez les normes suivantes publiées par le Bureau du commissaire des incendies du Canada:
 - a. Norme 301 'Norme Travaux de construction', juin 1982;
 - b. Norme 302 'Norme Travaux de soudage et de coupage au chalumeau', juin 1982.

.2 Usage du Tabac

1. Il est interdit de fumer dans les immeubles du CNRC, ainsi que sur les toits.
2. Respectez les écriteaux "DÉFENSE DE FUMER".

.3 Travail à chaud

- .1 Vous devez obtenir un permis de 'Travail à chaud' du représentant ministériel avant d'entreprendre des travaux de soudage, de brasage, de brûlage ou d'utilisation de chalumeaux et de salamandres ou d'une flamme nue.
- .2 Avant le début du travail à chaud, réexaminez l'aire de travaux avec le représentant ministériel pour déterminer le niveau de sécurité incendie nécessaire.

.4 Signalisation des Incendies

- .1 Soyez au courant de l'emplacement exact du téléphone et de l'alarme manuelle d'incendie les plus près, ainsi que le numéro de téléphone d'urgence.
- .2 SIGNALER immédiatement tout incident comportant un feu en procédant comme suit :
 - .1 Déclenchez l'alarme manuelle d'incendie le plus près;
 - .2 Téléphonnez au numéro de téléphone d'urgence suivant:

D'UN TÉLÉPHONE DU CNRC

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D'UN AUTRE TÉLÉPHONE

(613) 993-2411

- .3 Lorsque vous signalez un incendie par téléphone, indiquez l'endroit exact du feu, le nom et le numéro du bâtiment, et soyez prêts à vérifier le lieu
- .4 La personne qui déclenche l'alarme manuelle d'incendie doit demeurer sur la scène d'incendie pour fournir les renseignements et les indications nécessaires au personnel du service d'incendie.

.5 Réseaux Détecteurs et Alarmes d'Incendie à l'Intérieur et à l'Extérieur

- .1 N'OBSTRUEZ PAS ET NE FERMEZ PAS LES RÉSEAUX DÉTECTEURS ET ALARMES D'INCENDIE SANS L'AUTORISATION DU REPRÉSENTANT MINISTÉRIEL..
- .2 LORS D'UNE INTERRUPTION D'UN RÉSEAU AVERTISSEUR, DES MESURES SPÉCIALES DÉFINIES PAR LE REPRÉSENTANT MINISTÉRIEL DOIVENT ÊTRE PRISES POUR S'ASSURER QUE LA PROTECTION INCENDIE SOIT MAINTENUE.
- .3 NE LAISSEZ PAS LES RÉSEAUX DÉTECTEURS ET AVERTISSEURS D'INCENDIE INACTIFS A LA FIN D'UNE JOURNÉE DE TRAVAIL SANS AVOIR AVISÉ LE REPRÉSENTANT MINISTÉRIEL ET OBTENU SON AUTORISATION. LE REPRÉSENTANT MINISTÉRIEL DOIT INFORMER L'API DES DÉTAILS À CHAQUE OCCASION.
- .4 N'UTILISEZ PAS LES BORNES D'INCENDIE NI LES RÉSEAUX DE COLONNES MONTANTES ET ROBINETS ARMÉS À D'AUTRES FINS QUE LA LUTTE CONTRE L'INCENDIE SANS L'AUTORISATION DU REPRÉSENTANT MINISTÉRIEL.

.6 Extincteurs d'Incendies

- .1 Fournissez au moins un extincteur à poudre ABC (20 lb) pour chaque site de travail à chaud.
- .2 Fournissez les extincteurs suivants pour les travaux d'asphalte chaud et de toiture:
 - .1 Près du pot de goudron - 1 extincteur à poudre ABC (20 lb);
 - .2 Toiture - 2 extincteurs à poudre ABC (20 lb)..

- .3 Prévoir des extincteurs munis:
 - .1 d'une goupille et d'un sceau;
 - .2 d'un manomètre;
 - .3 d'une étiquette portant la signature d'un préposé d'une compagnie d'entretien d'extincteurs d'incendie.
 - .4 d'une étiquette portant la signature d'un préposé d'une compagnie d'entretien d'extincteurs d'incendie.
- .4 Les extincteurs à l'anhydride carbonique (CO) ne sont pas considérés comme des substituts des extincteurs ci-dessus.

.7 Travaux de Toiture

- .1 Chaudières:
 - .1 Prévoyez l'emplacement des chaudières d'asphalte et le lieu d'entreposage avec le représentant ministériel avant la livraison au chantier. N'installez pas les chaudières sur une toiture ou sur un échafaudage et placez-les à une distance d'au moins 10 m (30 pi) de tout bâtiment..
 - .2 Les chaudières doivent être équipées de thermomètres ou de jauges en bon état de fonctionnement.
 - .3 N'utilisez pas les chaudières à des températures excédant 232C (450F).
 - .4 Assurez une surveillance permanente pendant l'usage des chaudières et fournissez des couvercles de métal pour étouffer les flammes en cas de feu dans les chaudières. Fournissez les extincteurs d'incendie exigés à l'article 2.6.
 - .5 Expliquez les capacités des récipients au représentant ministériel avant le début des travaux
 - .6 Ranger les bouteilles de gaz comprimé debout à une distance d'au moins 6M (20 pieds) de la chaudière.
- .2 Balais à franges ('vadrouilles'):
 - .1 N'utilisez que des balais à franges en fibres de verre pour toitures.
 - .2 Enlevez les balais à franges usagés du lieu de travail à la fin de chaque journée de travail.
- .3 Application au chalumeau::
 - .1 N'UTILISEZ PAS DE CHALUMEAUX À PROXIMITÉ DES MURS.
 - .2 N'UTILISEZ PAS DE CHALUMEAUX POUR APPLIQUER DES MEMBRANES SUR DU BOIS EXPOSÉS OU DANS DES CAVITÉS
 - .3 Assurez une surveillance incendie conformément à l'article 2.9 de la présente section.
- .4 Rangez tous les matériaux combustibles utilisés pour les toitures à une distance d'au moins 3 m (10 pi) de toute structure.

- .5 Les bouteilles de gaz doivent être protégées des dommages mécaniques et maintenues en position verticale et a au moins d'au moins 6m (20 pieds) de la chaudière.

.8 Operations de soudure et de meulage

- .1 L'Entrepreneur doit fournir des couvertures ignifuges, des dispositifs d'extraction de fumée, de écrans et autre équipements similaires pour prévenir l'exposition aux éclairs d'arc de soudure ou étincelles de meulage

.9 Surveillance Incendie

- .1 Assurez une surveillance incendie pendant au moins une heure après la fin d'une journée de travail à chaud.
- .2 Chauffage provisoire : voir la Section 01000, Instructions générales.
- .3 Dotez les équipes de repérage des incendies des extincteurs prévus à l'article 2.6.

.10 Obstruction des voies d'évacuation des chaussées, des couloirs, des portes et des ascenseurs

- .1 Avisez le représentant ministériel avant d'entreprendre tout travail qui entraverait le libre passage du personnel du service d'incendie et de son équipement. Cela englobe toute dérogation à la hauteur libre minimale, à l'édification de barricades et au creusage de tranchées.
- .2 Les parcours d'issue du bâtiment ne doivent nullement être obstrués sans la permission expresse du représentant ministériel, qui s'assurera que des parcours de remplacement seront maintenus.
- .3 Le représentant ministériel avisera l'API de tout obstacle pouvant justifier une planification et des dispositifs de communication plus poussés pour assurer la sécurité des occupants et l'efficacité des interventions de lutte contre l'incendie.

.11 Débris et Déchets

- .1 Limitez autant que possible les détrituts et les déchets et les ranger à une distance d'au moins 20 pieds des chaudières ou des torches.
- .2 Il est interdit de faire brûler des détrituts sur le chantier.
- .3 Bennes à déchets
 - .1 En consultation avec le représentant ministériel, déterminez un emplacement sûr et acceptable avant de livrer la benne au chantier ou installer des chutes.
 - .2 Ne pas excéder la capacité de remplissage des bennes et garder le périmètre libre de tous débris
- .4 Stockage:

- .1 Soyez extrêmement prudents lorsque vous devez stocker des déchets combustibles sur les lieux de travail. Maintenez les lieux le plus propre possible et bien ventilés et respectez les normes de sécurité.
- .2 Déposez les torchons et autres matériaux graisseux ou huileux sujets à la combustion spontanée dans des contenants approuvés et évacuez-les comme exigé au paragraphe 3.1.

.12 Liquides Inflammables

- .1 La manutention, le stockage et l'utilisation de liquides inflammables sont régis par le Code national de prévention des incendies du Canada en vigueur.
- .2 Les liquides inflammables comme l'essence, le kérosène et le naphta, peuvent être gardés sur les lieux pour fins d'usage à brève échéance en quantités ne dépassant pas 45 litres (10 Gal Imp.) , à condition d'être stockés dans les bidons de sûreté portant le sceau d'approbation des LAC (ULC). Le stockage de plus grandes quantités de liquides inflammables aux fins de l'exécution des travaux qui nécessite l'autorisation du représentant ministériel.
- .3 Il est interdit de laisser des liquides inflammable sur les toits après les heures normales de travail
- .4 Il est interdit de transvaser des liquides inflammables à l'intérieur des bâtiments..
- .5 Il est interdit de transvaser des liquides inflammables à proximité de dispositifs à flamme nue ou de tout autre type de dispositif dégageant de la chaleur.
- .6 Il est interdit d'utiliser des liquides inflammables ayant un point d'éclair inférieur à 38C (100F, tels que le naphta ou l'essence, comme solvants ou agents de nettoyage.
- .7 Stockez les liquides résiduels inflammables dans des récipients approuvés situés dans un endroit sûr bien ventilé. Les déchets constitués de liquides inflammables doivent être régulièrement évacués du chantier.
- .8 Lorsque des liquides inflammables, tels que des laques ou des uréthanes, sont utilisés, veillez à ce que la ventilation soit adéquate et éliminer toute source d'inflammation. Prévenez le représentant ministériel avant le début de tels travaux et une fois les travaux achevés.

3. Questions et/ou demandes d'explications

- .1 Adressez vos questions ou demandes d'explications concernant la sécurité incendie au représentant ministériel.

END OF SECTION

NATIONAL RESEARCH COUNCIL CANADA
1200 MONTREAL ROAD
OTTAWA, ONTARIO
K1A 0R6



**DESIGNATED SUBSTANCES SURVEY
BUILDING M-19
OTTAWA, ONTARIO**

Prepared by:



Distribution:
2 copies - National Research Council Canada
1 copy - Oakhill Environmental

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EXECUTIVE SUMMARY

Oakhill Environmental (Oakhill) was retained by National Research Council Canada (NRC) to conduct a designated substances survey within Building M-19 in Ottawa, Ontario. All site work was completed from January 12th thru to January 18th, 2007, and on March 23rd, 2007.

All work carried out meets the requirements of the Ontario Occupational Health and Safety Act and WHMIS Regulation (formerly Bill 208). The purpose of the investigation was to identify any potential designated substances and mould.

Based on the visual inspection and laboratory analyses, designated substances were identified to be present in the facility. A summary of the survey recommendations is presented in Table 1.

Table 1 - Summary of Recommendations

Issue	Comments	Recommendations
Asbestos	Room 110 (FS# G001)	
	Six damaged areas (one severely damaged area) were identified on the firewall.	Encapsulate the five damaged areas on the firewall (1m ²) and remove the one severely damaged section of firewall (1m ²)
	Five damaged areas of mud joint compound fitting insulation were identified on the steam system.	Encapsulate the five damaged areas on the steam system.
	One severely damaged area of mud joint compound fitting insulation was identified on the steam system.	Remove the severely damaged fitting on the steam system.
	Two areas of damaged aircell pipe insulation were identified on the steam system.	Encapsulate each section of damaged aircell (0.5 metres each) for a total of one metre on the steam system.
	Two areas of damaged aircell pipe insulation were identified on the domestic hot water system.	Encapsulate each section of damaged aircell (0.5 metres each) for a total of one metre on the domestic hot water system.
	Two damaged areas of mud joint compound fitting insulation were identified on the domestic hot water system.	Encapsulate the two damaged fittings on the domestic hot water system.
	Five damaged areas of mud joint compound fitting insulation were identified on the domestic cold water system.	Encapsulate the five damaged fittings on the domestic cold water system.



Issue	Comments	Recommendations
	One area of damaged aircell pipe insulation (0.5 metres) was identified on the condensate system.	Encapsulate the 0.5 metre section of damaged aircell pipe insulation on the condensate system.
Room 112 (FS# G002)		
	Two damaged areas of mud joint compound fitting insulation were identified on the domestic cold water system.	Encapsulate the two damaged fittings on the domestic cold water system.
	One damaged area of mud joint compound fitting insulation was identified on the domestic hot water system.	Encapsulate the damaged fitting on the domestic hot water system.
	Two open ends of aircell pipe insulation were identified on the domestic hot water system.	Encapsulate each section of damaged aircell pipe insulation (0.1 metres each) for a total of 0.2 metres on the domestic hot water system.
	Two open ends of aircell pipe insulation were identified on the steam system.	Encapsulate each section of damaged aircell (0.1 metres each) for a total of 0.2 metres on the steam system.
Room 116 & 117 (FS# G009)		
	One area of damaged aircell pipe insulation (0.2 metres) was identified on the domestic cold water system.	Encapsulate the 0.2 metre section of damaged aircell pipe insulation on the domestic cold water system.
	One area of damaged aircell pipe insulation (0.2 metres) was identified on the condensate system.	Encapsulate the 0.2 metre section of damaged aircell pipe insulation on the condensate system.
	One area of damaged mud joint compound fitting insulation was identified on the domestic cold water system.	Encapsulate one damaged fitting on the domestic cold water system.
	One area of damaged mud joint compound fitting insulation was identified on the condensate system.	Encapsulate one damaged fitting on the condensate system.
	One area of damaged mud joint compound fitting insulation was identified on the steam system.	Encapsulate one damaged fitting on the steam system.
Room 211 (FS# 1002)		



Issue	Comments	Recommendations
	One area of damaged aircell pipe insulation (0.2 metres) was identified on the condensate system above the suspended ceiling.	Encapsulate the 0.2 metre section of damaged aircell pipe insulation on the condensate system.
Room 205 (FS# 1014)		
	One damaged section of aircell pipe insulation was identified on the hot water heating system above the suspended ceiling.	Remove 0.1 metres of severely damaged aircell pipe insulation and encapsulate two open ends on the hot water heating system.
Room 206 (FS# 1015)		
	One damaged section of aircell pipe insulation was identified on the hot water heating system above the suspended ceiling.	Encapsulate the damaged aircell pipe insulation (0.1 metres) on the hot water heating system.
	Two damaged areas of parging fitting insulation were identified on the chiller system above the suspended ceiling.	Remove the two damaged fittings on the chiller system.
Room 329 (FS# 2002)		
	One damaged area of mud joint compound fitting insulation was identified on the condensate system.	Encapsulate the damaged fitting on the condensate system.
	Two damaged areas of mud joint compound fitting insulation were identified on the steam system.	Encapsulate the two damaged fittings on the steam system.
Room 330 (FS# 2003)		
	One damaged area of mud joint compound fitting insulation was identified on the domestic cold water system.	Encapsulate the one damaged fitting on the domestic cold water system.
Room 232 (FS# 2006)		
	One damaged area of mud joint compound fitting insulation was identified on the steam system.	Encapsulate the one damaged fitting on the steam system.
Room 328c (FS# 2009)		
	One damaged area of mud joint compound fitting insulation was identified on the condensate system above the suspended ceiling.	Encapsulate the one damaged fitting on the condensate system.



Issue	Comments	Recommendations
	Room 328d (FS# 2010)	
	One damaged section of aircell pipe insulation was identified on the steam system.	Encapsulate the damaged aircell pipe insulation (0.1 metres) on the steam system.
	One damaged area of mud joint compound fitting insulation was identified on the condensate system.	Encapsulate the one damaged fitting on the condensate system.
	Three damaged areas of mud joint compound fitting insulation were identified on the steam system.	Encapsulate the three damaged fittings on the steam system.
	Stairwell 'D' (FS# SW02)	
	One damaged section of aircell pipe insulation was identified on the hot water heating system.	Encapsulate the damaged aircell pipe insulation (0.5 metres) on the hot water heating system.
Lead	<p>Ten paint samples were submitted for lead analysis. Lead was detected in all of the samples submitted. However, only two of the paint samples submitted were found to contain significant levels of lead (i.e., equal to or greater than 5000 ppm).</p> <p>The red paint used over white paint on piping in room 110 had a reading of 18,200 ppm.</p> <p>The red paint used over a layer of green on the fire-hose cabinet in room 110 had a reading of 8,200 ppm.</p> <p>Lead may also be present in the solder used on copper domestic water lines, as caulking in bell fittings for cast iron drainage pipes, in glazing on the ceramic tiles and in electrical equipment, wiring or fixtures.</p>	<p>The draft Proposed Lead Regulation on Construction Projects, May 5, 1995, (enforced by the Ministry of Labour) does not require removal of lead paint or lead-based materials, unless work on these materials is likely to produce lead fumes or dust, for example during welding, torch cutting, grinding, sanding or sandblasting.</p> <p>Although not in use, the remainder of old metallic lead piping in the finance building should be removed following Reg. 843 and disposed of according to Reg. 558.</p> <p>In the event that such work is conducted at this facility, ensure that lead fumes or dust do not exceed the maximum allowable Time Weighted Average Exposure Value (TWAEV) of 0.15 mg/m³ as prescribed by the OHSA.</p>



Mercury	Mercury vapour may be present in fluorescent light tubes and thermostats. Mercury may also be present in paints and adhesives.	Mercury, or mercury vapour within light fixtures, pose no risk to workers or occupants, provided the mercury containers remain intact and undisturbed. Where possible, fluorescent lights should be recycled at an approved recycling facility. Mercury must be handled and disposed of in accordance with O. Reg. 390/00 and O. Reg. 558/00.
Silica	Silica may be present in concrete, cement mortar and non-fibreglass acoustic ceiling tiles.	Ensure workers performing demolition work are not exposed to airborne silica levels in excess of 0.20 mg/m ³ by providing respiratory protection, and/or wetting down work area, and providing workers with a facility to properly wash prior to exiting the work area as prescribed by O.Reg.845/90.
Mould	Mould is suspected to be present in functional space # 2015 (room 312) on the pipe insulation and duct insulation.	Recommend that initially, bulk fungal analysis be performed to the species level. Once the hazard can be qualified, the mouldy insulation can be removed and the source of the moisture can be mitigated.

None of the other designated substances were observed during the course of the survey inspection.



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1.0 INTRODUCTION

Oakhill Environmental (Oakhill) was retained by the National Research Council Canada (NRC) to perform a survey for Designated Substances and mould of Building M-19 in Ottawa, Ontario. Building M-19 was surveyed January 12th to January 18th, 2007, and on March 23rd, 2007.

The purpose of the investigation was to identify any building materials or equipment containing certain substances termed “Designated Substances” and mould.

This survey will enable NRC to:

1. Manage asbestos containing materials (ACM’s) to ensure that these materials are in good condition and provide recommendations for ACM’s that are in need of repair,
2. Provide this report to NRC building managers, project managers, contractors and subcontracts enabling them to comply with O. Reg. 278/05, the regulation regarding asbestos on construction projects and in buildings and repair operations, and
3. Provide a comprehensive survey, which will enable NRC to develop a Management Plan to deal with designated substances.

1.1 Limitations

This report details the accessible Designated Substances found within the building and the exterior walls. Representative views were made above accessible suspended ceiling systems. Throughout the process of inspection there were, on numerous occasions, areas that were inaccessible. These areas include but are not limited to: areas above solid ceilings, areas behind solid walls and internal components of machinery or equipment. These areas require intrusive investigative techniques, which may compromise the integrity of that system. An example of an intrusive issue is asphaltic roofing felts (tar paper), which may contain asbestos. However, due to the potential for damages to the building and its contents, as well as safety reasons, no samples were obtained from the roofing systems at the facility. Intrusive investigative techniques are only undertaken at the expressed request of NRC staff where forthcoming renovations projects are known.

Any area that was not inspected and considered inaccessible in this report should be dealt with cautiously in future endeavours before undertaking any form of work, as there may be ACM in this area. In such future situations, samples should be collected and analyzed of all suspect ACM before commencing work. Any area that was not accessible at the time of inspection would be noted within the report.



The report reflects the observations of accessed areas, findings and analysis of materials sampled during the survey. Designated Substances may have been removed from or added to the project area. It is the NRC's responsibility to disclose whether any Designated Substances have been added to or removed from the project area.

The material in it reflects Oakhill's best judgement based on the information discovered at the time of preparation and within the Designated Substance Survey scope of work. There may be materials on-site, which are not represented by these investigations. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Oakhill accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

2.0 SCOPE OF WORK

The purpose of the investigation was to identify any building materials or equipment containing certain substances termed "Designated Substances" and mould. The scope defined for this project is summarized below.

1. To provide assessments for the presence of Designated Substances which include:
 - Acrylonitrile
 - Arsenic
 - Asbestos
 - Benzene
 - Coke Oven Emissions
 - Ethylene Oxide
 - Isocyanates
 - Lead
 - Mercury
 - Silica (free crystalline silica)
 - Vinyl Chloride (vinyl chloride monomer, not PVC)
 - and in addition Mould
2. Assessment will include building materials and components incorporated in the structure and finishes (including exterior finishes). Items not included are building and service tunnels, owner or occupant articles within the building (e.g. process materials or equipment, furniture, etc.), soil contaminants, groundwater, vessels, drums or underground storage tanks)
3. To collect samples of suspect building materials to verify the presence of asbestos and lead
4. To provide testing from a certified laboratory on samples collected of suspect asbestos and lead
5. Provide three hard and electronic (PDF) copies of the final report



3.0 REGULATORY CRITERIA, STANDARDS AND GUIDELINES

The following regulatory criteria, standards, and guidelines were applied for the interpretation and reporting of observations, laboratory data, and on-site monitoring data. The building materials and contents were visually examined to determine the presence of the following designated substances in accordance with the requirements of the Ministry of Labour's (MOL) Occupational Health and Safety Act, Section 30:

Acrylonitrile	O. Reg. 835/90 as amended by O. Reg. 101/04
Arsenic	O. Reg. 836/90 as amended by O. Reg. 102/04
Asbestos	O. Reg. 278/05 and O. Reg. 347/90
Benzene	O. Reg. 839/90 as amended by O. Reg. 105/04
Ethylene Oxide	O. Reg. 841/90 as amended by O. Reg. 107/04
Isocyanates	O. Reg. 842/90 as amended by O. Reg. 108/04
Lead	O. Reg. 843/90 as amended by O. Reg. 109/04
Mercury	O. Reg. 844/90 as amended by O. Reg. 110/04 and the MOL guideline
Silica	O. Reg. 845/90 as amended by O. Reg. 111/04
Vinyl Chloride	O. Reg. 846/90 as amended by O. Reg. 112/04

Asbestos Containing Material (ACM) is defined as "Material that contains 0.5% or more asbestos by dry weight". Friable Material is defined as "material that: (a) when dry, can be crumbled, pulverized or powdered by hand pressure, or (b) is crumbled, pulverized or powdered".

For asbestos, lead and silica the above regulations define exposure guidelines for a worker's time-weighted average exposure of the material in air. Airborne levels should not exceed 0.01 fibres/m³ of asbestos in air, 0.15 mg/m³ of lead in air, 4.3 mg/m³ of acrylonitrile in air, 0.2 mg/m³ of arsenic in air, 3.0 mg/m³ of benzene in air and 0.2 mg/m³ of silica in air. The above regulations classify disturbances (Type 1, Type 2, and Type 3), handling requirements, respiratory requirements and monitoring requirements.

The Ministry of Labour published, The Safe Handling of Mercury, A Guideline for the Construction Industry, Jan 1991, outlining the health effects, sources, respiratory protection during the clean up of mercury. From the U.S. Department of Housing and Urban Development, Lead- Based Paint is classified as any paint application containing at least 1.0 milligrams of lead per square centimetre of surface area (1.0 mg/cm²) or at least 0.5% lead content by weight (5,000 ppm) or 5,000 µg/g.

The Provincial Government has issued O. Reg. 558/00 controlled under R.R.O. 1990, Regulation 347 outlining generator, hauler and receiver requirements for wastes dependant on the results of leachate analyses. Provincial and Federal regulations also outline the packaging and transportation of wastes.



4.0 SURVEY METHODOLOGY

4.1 Background Information Review

Reviewing existing reports, interviewing knowledgeable NRC staff, and reviewing as-built drawings allowed Oakhill to obtain a basic understanding of potential issues regarding each building.

4.2 Field Investigation

A detailed visual survey of all accessible areas of the building on a room-by-room basis, including ceiling spaces above removable acoustical ceiling tiles; and wall spaces behind removable panels. Each area or room of the building was assigned a four-digit functional space identification number beginning with 1001. A room-by-room inspection was conducted for Designated Substances in all accessible areas. All suspect ACM and lead were sampled and were categorized with a unique homogeneous material number. Visual assessment of all known and suspect ACM included assessment as to friability, type, quantity, condition, accessibility, appropriate response, as well as comments made on the potential or likelihood of future damage or exposure to ACM by building occupants. Quantification of all ACMs were approximations only, not actual measurements were taken. Square metres or lineal metres were generally used for quantifying ACM. All ACMs are documented through functional space forms and photographs.

In the performance of this Designated Substances survey, Oakhill utilized the project team comprised of the following staff:

Mr. Fil Barillaro, M.A.Sc., P.Eng.	Project Manager
Mr. Kevin Christian, M.Sc., P.Geo.	QA Reviewer
Mr. Bill McGovern	Environmental Analyst
Mr. Raivo Tahiste	Environmental Analyst
Mr. Gino Barillaro	Environmental Analyst
Mr. Sean Bagnulo	Environmental Analyst
Ms. Tanya Fiocca	Administration

4.2.1 Homogenous Materials

Materials were grouped to be homogenous. That is, materials that are uniform in colour and texture were assumed to be similar in content. Regarding asbestos, samples collected of suspect materials adhered to O. Reg. 278/05, Table 1 Bulk Material Samples – Section 3 (3), for minimum sample requirements for respective suspect materials and quantities. Samples were randomly collected to be representative of each suspect ACM and lead material and then assigned a homogenous material number accordingly. A homogenous materials list was generated which consists of suspect ACM sampled, with positive materials highlighted. The Homogenous Materials List is located in Table 3 of this report.



4.3 Sample Collection

Collection of bulk samples of suspect materials for submission to AGAT Laboratories Ltd., in Mississauga, Ontario for analysis for asbestos (as percentage asbestos fibre, and type of asbestos fibre) and for lead (ug/g).

4.3.1 Bulk Sample Collection

Oakhill field staff wore half-face respirators with P100 cassettes during bulk sampling events. Building materials were pre-dampened with an application of amended water from a spray bottle to suppress surface and airborne fibres prior to disturbance for sample collection.

The building material sampled was sealed with caulking after sample collection to restore the material to its original condition. Every effort to minimize intrusion of the sampled building materials was always of paramount consideration. Each sample was sealed in a new plastic bag and labeled with a unique sample number and then double bagged. Chain of custody records were completed on-site and submitted with all samples to an approved laboratory.

All bulk materials sampled were randomly collected and are representative of each area of homogenous material. The minimum number of bulk materials to be collected from an area of homogenous material was in accordance with O. Reg. 278/05, Section 3 (3) (Table 1). All analysis of suspect asbestos containing materials was conducted according to O. Reg. 278/05, Section 3 (1) which states that the following standard be used: U.S. Environmental Protection Agency. Test method EPA/600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials. June 1993. Sample locations are depicted in Appendix D.

4.3.2 Sample Analysis

All bulk samples were submitted to AGAT Laboratories Inc. (AGAT) in Mississauga, Ontario, an independent laboratory, for analysis.

AGAT has been evaluated and has been found to comply with the criteria and standards established by the Canadian Association for Environmental Laboratories (CAEAL) for asbestos fibre analysis by phase contrast microscopy. The American Industrial Hygiene Association (AIHA) has accredited AGAT for the Industrial Hygiene Laboratory Accreditation Program for Asbestos using optical microscopy. Suspect bulk



samples were analyzed using polarized light microscopy, and were based on a “test for first positive” approach.

Laboratory results of the asbestos and lead sampling can be found in Appendices B and C respectively.

5.0 FINDINGS AND RECOMMENDATIONS

The results of the survey for designated substances and mould at building M-19 are discussed below.

5.1 Asbestos

All potential asbestos-containing materials sampled have been compiled into a homogenous materials list. Each homogenous material is given a homogeneous number, description, analytical result and corresponding sample numbers. The homogeneous materials list for building M-19 is shown in Table 2.

Table 2 – Homogeneous Materials List

Homo Mat. No.	Material Description	Asbestos Type & Conc.	Sample No.
01	2' x 4' Ceiling Tile (scattered divot pattern)	<0.5 %	M19-01
02	Drywall (with drywall mud)	<0.5 %	M19-02
03	Stucco	<0.5 %	M19-03
04	12" x 12" Floor Tile (grey)	<0.5 %	M19-04
05	2' x 4' Ceiling Tile (scattered dot pattern)	<0.5 %	M19-05
06	Mud joint compound (from 80's addition) Fitting Insulation	<0.5 %	M19-06
07	12" x 12" Floor Tile (beige with red and brown)	<0.5 %	M19-07
08	Aircell Pipe Insulation	20% Chrysotile	M19-08
09	Sweat Wrap (with tar paper layer) Pipe Insulation	<0.5 %	M19-09
10	Mud Joint Compound Fitting Insulation (grey)	10% Chrysotile	M19-10
11	Firewall (transite with non-acm fibrous insulation core)	15% Chrysotile	M19-11
12	Parging Fitting Insulation (grey with no jacketing)	10% Chrysotile	M19-12
13	12" x 12" Ceiling Tile (large dot pattern)	<0.5 %	M19-13
14	12" x 12" Floor Tile (off white with grey)	<0.5 %	M19-14
15	Mud Joint Compound Fitting Insulation (grey)	10% Chrysotile	M19-15
16	12" x 12" Floor Tile (tan)	<0.5 %	M19-16
17	Plaster	<0.5 %	M19-17
18	Transite wall panel	12% Amosite	M19-18
19	Mud Joint Compound Fitting Insulation (tan)	<0.5 %	M19-19
20	Sweat Wrap (with white paper layer) Pipe Insulation	15% Chrysotile	M19-20
21	Sweat Wrap (layers of cardboard) Pipe Insulation	<0.5 %	M19-21
22	Thermal Patch	<0.5 %	M19-22



Homo Mat. No.	Material Description	Asbestos Type & Conc.	Sample No.
23	Terracotta and Mortar Wall	<0.5 %	M19-23
24	Mud Joint Compound Fitting Insulation (tan)	<0.5 %	M19-24
25	Old Exterior Finish (from old exterior wall)	<0.5 %	M19-25
26	9" x 9" Floor Tile (green)	2% Chrysotile	M19-26
27	ACM Cement Deck	20% Chrysotile	M19-27
28	9" x 9" Floor Tile (brown with white streaks)	2% Chrysotile	M19-28
29	Linoleum (off white with grey square pattern)	<0.5 %	M19-29
30	Floor Tile (red)	<0.5 %	M19-30
31	Adhesive Backing (from previous ceiling tiles)	Non-Asbestos	M19-31
32	12" x 12" Ceiling Tile (large and small dot pattern)	Non-Asbestos	M19-32
33	12" x 12" Ceiling Tile (small dot pattern)	Non-Asbestos	M19-33
34	2' x 4' Ceiling Tile (horizontal divot pattern)	Non-Asbestos	M19-34

Homo. Mat. No. – Homogeneous Material Number Conc. – Concentration ND – Not Detected

5.1.1 Survey Findings

Suspect ACM building materials on the ceilings, floors, walls, mechanical, and structural systems were sampled throughout the facility. Of the thirty-four bulk materials that were sampled and compiled into the homogeneous list, eleven were found to contain asbestos. Please note that sample results of homogeneous material number 30 were negative, it is Oakhill's opinion that 9" by 9" floor tiles should be treated as ACM. This false negative is believed to be a result of the limitations of the laboratory methodology of Polarized Light Microscopy (PLM) with tightly bound materials.

The eleven building materials that contain asbestos are as follows:

- 1) Aircell pipe insulation on the domestic hot and cold water, hot water heating, condensate and steam systems.
- 2) Mud joint compound fitting insulation on the steam, domestic cold water, domestic hot water, condensate and hot water heating systems.
- 3) Firewall.
- 4) Parging fitting insulation on the chiller system.
- 5) Mud joint compound fitting insulation on the steam and condensate systems.
- 6) Transite panels used on walls in some areas.
- 7) Sweat wrap (with white paper layer) pipe insulation on the domestic cold water system.
- 8) 9" x 9" (green) floor tile.
- 9) ACM cement deck located throughout the second floor decking (excluding building additions).
- 10) 9" x 9" floor tile (brown with white streaks).



11) 9" x 9" floor tile (red).

Table 3 provides a summary of all asbestos-containing materials by room. This table can be cross-referenced with the functional space forms in Appendix B to find a complete description of the room where ACM materials were encountered.

Table 3 – Summary of ACM by Room Listing

Functional Space ID#	Location	Homo. Mat. No.	Material Description and Quantity	Response Measure
<i>Ground Level</i>				
G001	Rm. 110	13	12" x 12" transite ceiling tile – 1 m ²	O & M
		08	Aircell pipe insulation on the steam system – 56 LM	O & M
		08	Aircell pipe insulation on the steam system – 1 LM	2 Encaps.
		10	Mud joint compound fitting insulation on the steam system – 21 units	O & M
		10	Mud joint compound fitting insulation on the steam system – 6 units	5 Encaps, 1 Removal
		08	Aircell pipe insulation on the domestic hot-water system – 29 LM	O & M
		08	Aircell pipe insulation on the domestic hot-water system – 1 LM	2 Encaps.
		10	Mud joint compound fitting insulation on the domestic hot water system – 14 units	O & M
		10	Mud joint compound fitting insulation on the domestic hot water system – 2 units	2 Encaps.
		08	Aircell pipe insulation on the condensate system – 10 LM	O & M
		08	Aircell pipe insulation on the condensate system – 0.5 LM	1 Encap.
		10	Mud joint compound fitting insulation on the condensate system – 3 units	O & M
		11	Firewall – 83 m ²	O & M
		11	Firewall – 1 m ²	5 Encaps.
		11	Firewall – 1 m ²	1 removal
		12	Parging on fitting of the chiller system – 6 units	O & M
		10	Mud joint compound fitting insulation on the domestic cold water system – 6 units	O & M
10	Mud joint compound fitting insulation on the domestic cold water system – 5 units	5 Encaps.		
G002	Rm. 112	18	Transite wall panel – 17 m ²	O & M
		08	Aircell pipe insulation on the domestic hot water system – 13 LM	O & M
		08	Aircell pipe insulation on the domestic hot water system – 0.2 LM	2 Encaps.
		10	Mud joint compound fitting insulation on the domestic hot water system – 1 unit	1 Encap.
		08	Aircell pipe insulation on the steam system – 13 LM	O & M
		08	Aircell pipe insulation on the steam system – 0.2 LM	2 Encaps.
		10	Mud joint compound fitting insulation on the condensate system – 5 units	O & M
		10	Mud joint compound fitting insulation on the domestic cold-water system – 7 units	O & M



		10	Mud joint compound fitting insulation on the domestic cold-water system – 2 units	2 Encaps.
G004	Rm. 110b	18	Transite wall panel – 13 m ²	O & M
		08	Aircell pipe insulation on the condensate system – 4 LM	O & M
		15	Mud joint compound fitting insulation on the condensate system – 15 units	O & M
		15	Mud joint compound fitting insulation on the domestic cold water system – 6 units	O & M
		08	Aircell pipe insulation on the domestic hot water system – 3 units	O & M
		15	Mud joint compound fitting insulation on the steam system – 19 units	O & M
		08	Aircell pipe insulation on the steam system – 6 LM	O & M
G006	Rm. 110a	15	Mud joint compound fitting insulation on the steam system – 6 units	O & M
		15	Mud joint compound fitting insulation on the condensate system – 3 units	O & M
G007	Rm. 103	10	Mud joint compound fitting insulation on the steam system – 1 unit	O & M
		10	Mud joint compound fitting insulation on the condensate system – 1 unit	O & M
G008	Rm. 105	08	Aircell pipe insulation on the steam system – 4 LM	O & M
		08	Aircell pipe insulation on the condensate system – 4 LM	O & M
G009	Rms. 116, 117 & 102	10	Mud joint compound fitting insulation on the domestic cold-water system – 19 units	O & M
		20	Brown waffle paper with white paper pipe insulation on the domestic cold-water system – 15 LM	O & M
		08	Aircell pipe insulation on the domestic cold-water system – 15 LM	O & M
		08	Aircell pipe insulation on the domestic cold-water system – 0.2 LM	1 Encap.
		10	Mud joint compound fitting insulation on the domestic cold-water system – 1 unit	1 Encap.
		10	Mud joint compound fitting insulation on the condensate system – 6 units	O & M
		08	Aircell pipe insulation on the condensate system – 6 LM	O & M
		08	Aircell pipe insulation on the condensate system – 0.2 LM	1 Encap.
		10	Mud joint compound fitting insulation on the condensate system – 1 unit	1 Encap.
		10	Mud joint compound fitting insulation on the steam system – 11 units	O & M
		10	Mud joint compound fitting insulation on the steam system – 1 unit	1 Encap.
		08	Aircell pipe insulation on the domestic hot-water system – 38 LM	O & M
		10	Mud joint compound fitting insulation on the domestic hot water system – 10 units	O & M
1002	Rms. 210, 211	20	Sweat wrap (with white paper layer) pipe insulation on the domestic cold-water system – 4 LM	O & M
		10	Mud joint compound fitting insulation on the steam system – 8 units	O & M
		10	Mud joint compound fitting insulation on the condensate system – 6 units	O & M
		08	Aircell pipe insulation on the condensate system – 5 LM	O & M
		08	Aircell pipe insulation on the condensate system – 0.2 LM	1 Encap.
1007	Rms. 220, 221, 222, 224 (OSHA area)	08	Aircell pipe insulation on the hot water heating system – 59 LM	O & M
		10	Mud joint compound fitting insulation on the hot water heating system – 8 units	O & M
		12	Parging on fitting of chiller system – 4 units	O & M
1008	Rm. 228, 231, 231B,	08	Aircell pipe insulation on the hot-water heating system – 6 LM	O & M



	(Security area)	10	Mud joint compound fitting insulation on the hot-water heating system – 3 units	O & M
		12	Parging on fitting of chiller system – 8 units	O & M
1009	Rms. 230, 236, 237, 238 (Realty office area)	08	Aircell pipe insulation on the hot-water heating system – 84 LM	O & M
		10	Mud joint compound fitting insulation on the hot water heating system – 14 units	O & M
		12	Parging on fitting of chiller system – 16 units	O & M
1010	1 st floor corridor & stairwells A, H	10	Mud joint compound fitting insulation on the hot water heating system – 12 units	O & M
		08	Aircell pipe insulation on the hot-water heating system – 20 LM	O & M
		12	Parging on fittings of chiller system – 6 units	O & M
1011	Rm. 203	10	Mud joint compound fitting insulation on the chiller system – 18 units	O & M
		08	Aircell pipe insulation on the hot-water heating system – 25 LM	O & M
		10	Mud joint compound fitting insulation on the hot-water heating system – 11 units	O & M
1012	Rm. 227	30	Red 9”x 9” floor tile – 0.5 m ² (see FS form)	O & M
		30	Dark brown 9” x 9” floor tile – 0.5 m ²	O & M
		12	Parging on fitting of chiller system – 6 units	O & M
		08	Aircell pipe insulation on the hot water heating system – 2 LM	O & M
		10	Mud joint compound fitting insulation on the hot water heating system – 1 unit	O & M
1014	Rm. 205	12	Parging on fittings of chiller system – 2 units	O & M
		08	Aircell pipe insulation on the hot water heating system – 3 LM	O & M
		08	Aircell pipe insulation on the hot water heating system – 0.1 LM	1 removal & 2 Encaps.
1015	Rm. 206	10	Mud joint compound fitting insulation on the domestic cold water system – 9 units	O & M
		08	Aircell pipe insulation on the hot water heating system – 23 LM	O & M
		08	Aircell pipe insulation on the hot water heating system – 0.1 LM	1 Encap.
		12	Parging on fitting of chiller system – 4 units	O & M
		12	Parging on fitting of chiller system – 2 units	2 Removals
		10	Mud joint compound fitting insulation on the hot water heating system – 8 units	O & M
2002	Rm. 329	18	Transite wall panel – 80 m ²	O & M
		27	ACM cement deck – 564 m ²	O & M
		10	Mud joint compound fitting insulation on the condensate system – 18 units	O & M
		10	Mud joint compound fitting insulation on the condensate system – 1 unit	1 Encap.
		10	Mud joint compound fitting insulation on the steam system – 27 units	O & M
		10	Mud joint compound fitting insulation on the steam system – 2 units	2 Encaps.
		10	Mud joint compound fitting insulation on the domestic cold water system – 4 units	O & M
		20	Sweat wrap (with white paper layer) pipe insulation on the domestic cold water system – 18 LM	O & M
2003	Rm. 330	18	Transite wall panel – 180 m ²	O & M
		20	Sweat wrap (with white paper layer) pipe insulation on the domestic cold water system – 10 LM	O & M
		10	Mud joint compound fitting insulation on the domestic cold water system – 5 units	O & M



		10	Mud joint compound fitting insulation on the domestic cold-water system – 1 unit	1 Encap.
		10	Mud joint compound fitting insulation on the condensate system – 4 units	O & M
		10	Mud joint compound fitting insulation on the steam system – 8 units	O & M
			ACM cement deck – 72 m ²	O & M
2005	Rm. 323a	26	Green with grey 9" x 9" floor tile – 27 m ²	O & M
		27	ACM cement deck – 27 m ²	O & M
		18	Transite wall panel – 105 m ²	O & M
		27	ACM cement deck - 163 m ²	O & M
		08	Aircell pipe insulation on the condensate system – 6 LM	O & M
		08	Aircell pipe insulation on the steam system – 30 LM	O & M
		10	Mud joint compound fitting insulation on the domestic cold-water system – 3 units	O & M
		20	Sweat wrap (with white paper layer) pipe insulation on the domestic cold-water system – 14 LM	O & M
		10	Mud joint compound fitting insulation on the steam system – 8 units	O & M
		10	Mud joint compound fitting insulation on the steam system – 1 unit	1 Encap.
2007	Rms. 310, 301a, 303	27	ACM cement deck - 58 m ²	O & M
		27	ACM cement deck - 45 m ²	O & M
2008	Rms. 326, 326a, 326b	10	Mud joint compound fitting insulation on the condensate system – 6 units	O & M
		10	Mud joint compound fitting insulation on the steam system – 4 units	O & M
		27	ACM cement deck - 110m ²	O & M
2009	Rm. 328	10	Mud joint compound fitting insulation on the condensate system – 3 units	O & M
		10	Mud joint compound fitting insulation on the condensate system – 1 unit	1 Encap.
		18	Transite wall panel – 55 m ²	O & M
2010	Rms. 328 (d, e, f) & stairwell C	27	ACM cement deck - 129 m ²	O & M
		08	Aircell pipe insulation on the steam system – 34 LM	O & M
		08	Aircell pipe insulation on the steam system – 0.1 LM	1 Encap.
		10	Mud joint compound fitting insulation on the condensate system – 10 units	O & M
		10	Mud joint compound fitting insulation on the condensate system – 1 units	1 Encap.
		10	Mud joint compound fitting insulation on the steam system – 19 units	O & M
		10	Mud joint compound fitting insulation on the steam system – 3 units	3 Encaps.
2011	Rm. 304	27	ACM cement deck - 18m ²	O & M
2012	Rm. 305	27	ACM cement deck - 3 m ²	O & M
		28	Brown 9" x 9" floor tile – 3 m ²	O & M
		27	ACM cement deck - 85m ²	O & M
2013	Front entrance and hallway	28	Green 9" x 9" floor tile – 15 m ²	O & M
		28	White 9" x 9" floor tile – 15 m ²	O & M
2014	Men's washroom (Rm. 314)	27	ACM cement deck – no access above ceiling; ACM cement deck is likely present above the ceiling in this area	N/A
2015	Rms. 315,	27	ACM cement deck - 290 m ²	O & M



	313, 312, (312a, b, c, d), 308, 306	30	Red 9" x 9" floor tile – 283 m ²	O & M
2016	Rm. 317	26	Green 9" x 9" floor tile – 9 m ²	O & M
		27	ACM cement deck – no access above ceiling; ACM cement deck is likely present above the ceiling in this area	N/A
2017	Rm. 319a - Office	27	ACM cement deck - 14m ²	O & M
2018	Rm. 319b- Office	27	ACM cement deck - 15m ²	O & M
2019	Rm. 318	27	ACM cement deck - 49m ²	O & M
2020	Rm. 320	27	ACM cement deck - 24m ²	O & M
SW02	Stairwell 'D' and rm. 101	10	Mud joint compound fitting insulation on the condensate system – 6 units	O & M
		08	Aircell pipe insulation on the condensate system – 2 LM	O & M
		10	Mud joint compound fitting insulation on the steam system – 7 units	O & M
		08	Aircell pipe insulation on the steam system – 2 LM	O & M
		08	Aircell pipe insulation on the hot water heating system – 0.5 LM	1 Encap.
		08	Aircell pipe insulation on the hot water heating system – 2 LM	O & M
		10	Mud joint compound fitting insulation on the hot water heating system – 1 unit	O & M
SW03	Stairwell 'E'	10	Mud joint compound fitting insulation on the hot-water heating system – 3 units	O & M
M001	Fitness room and stairwell 'B'	18	Transite wall panel – 18 m ²	O & M
		12	Parging fitting insulation on the chiller system – 2 units	O & M
M003	Rm. 324 and stairwell 'F'	27	ACM cement deck - 68 m ²	O & M
		20	Sweat wrap (with white paper layer) pipe insulation on the domestic cold-water system – 6 LM	O & M

LM – linear metre O&M – Operations & Maintenance Encap. – Encapsulation Homo. – Homogeneous Mat. - Materials

Asbestos was detected in eleven homogeneous building materials sampled from the facility. The ACM was categorized as to whether it was friable or non-friable. Further, the materials were grouped according to their similar composition, system and general appearance. The following sub-sections are the result of which materials were considered friable or non-friable. Photographs are provided along with a brief description of the material.



5.1.2 Friable ACM

Mud Joint Compound

A representative photograph of mud joint compound fitting insulation. This material is a malleable grey insulation that has the appearance of granular mud. It appears smooth, round and hard when it is intact with appropriate exterior jacketing.



Aircell

A representative photograph of aircell pipe insulation. This material is grey and white in colour. Aircell is layers of corrugated paper, which gives it the appearance of a honeycomb pattern when the profile is observed.





Sweat Wrap (with white paper layer)

A representative photograph of sweat wrap with white paper layer pipe insulation. This material has several layers of brown or grey waffle pattern paper layers with the outer layer consisting of a white paper layer that contains asbestos. This type of pipe insulation was used for low temperature applications only.



Parging

A representative photograph of parging fitting insulation. This material is a malleable grey insulation that has the appearance of granular mud. It appears smooth, round and soft. It is similar to mud joint compound (described above) but is softer and can be pulverized by hand pressure much easier.





5.1.3 Non-Friable ACM

Transite Panel

A representative photograph of transite panel. Transite is a composite material made up of asbestos and cement that was a manufactured product at the time of installation. It was generally used in areas as a fire retardant. It is a rigid material that fractures when broken and may appear as other types of non-acm panel.



ACM Cement Deck

A representative photograph of ACM cement deck. This material is a composite of asbestos and cement that was a manufactured product at the time of installation. It is very similar to transite panel and was generally used in areas as a fire retardant.





9" x 9" Floor Tile

A representative photograph of 9" x 9" vinyl asbestos floor tile (VAT). This material may be found in any number of different colours and patterns. VAT's are normally quite rigid and non-friable. They are sometimes found under carpeting.



5.1.4 Survey Recommendations

Under Ontario Regulation (O. Reg.) 278/05 damaged and exposed ACMs are required to be repaired or removed. In building M-19, the damaged/exposed asbestos-containing materials, found in Table 3 and summarized in Table 1, will require Type 2 asbestos abatement procedures for removal or repair of 1 square meter or less of material and Type 3 asbestos abatement precautions for removal of greater than 1 square meter of material. These issues should be addressed as soon as possible.

The O. Reg. 278/05 also requires the removal of all ACM's that have a potential of being disturbed during renovations or demolition. Should friable ACM's remain in the building, in GOOD condition, the regulation also requires that an Asbestos Management Plan be implemented and kept in place until such time that the ACM's have been removed. The management plan will include periodic assessment and record updating to be performed on the remaining ACM at least every 12 months.

Building staff and contractors should be made aware of the location and hazards associated with the ACM's and instructed to not disturb this material. Any disturbance of this material should be reported immediately to property management and appropriate control measures put into place without delay.



5.2 Lead

5.2.1 Survey Findings

Based on visual observations during Oakhill's room-by-room surveys, potential lead was sampled in ten paint finishes. Samples were collected from the painted interior surfaces of building M-19 and were analysed for lead content.

The analytical results are provided in Appendix C and are summarized below in Table 4.

Table 4 – Results of Lead Investigation

Sample				
M19-L1	Drain pipe in stockroom (FS# G001)	Beige paint.	1,800	No
M19-L2	Steel girder in stockroom (FS# G001)	Pale green paint	3,930	No
M19-L3	Stairs and railing in stockroom (FS# G001)	Grey paint	1,720	No
M19-L4	Pipe in publication department (FS# G003)	White paint	761	No
M19-L5	Bldg M19 – Paint on pipe in stockroom (FS# G001)	Red paint over white paint.	18,200	Yes
M19-L6	Bldg M19 – Paint on fire-hose cabinet in stockroom (FS# G001)	Red paint over green paint.	8,200	Yes
M19-L7	Door and door frame in stockroom (FS# G001)	Blue paint	68.4	No
M19-L8	Pipe in stockroom (FS# G001)	Black paint	<7.0	No
M19-L9	Pipe and wall (FS# 2002)	Peach paint	642	No
M19-L10	Pipe and wall (FS# 2003)	Green paint	252	No

*Note: Ontario Ministry of Labour (MOL) considers 5,000ppm lead to be a lead-based paint (LBP).

5.2.2 Survey Recommendations

Based on the analytical results, two of the ten paints sampled contain greater than 5,000 ppm lead and are therefore classified as lead-based paints.

Lead may be present in the solder used on copper domestic water lines, as caulking in bell fittings for cast-iron drainage pipes and in electrical equipment, wiring or fixtures.

Direct disturbance of the materials can minimize the impact of lead products during removal. Removal of lead materials as an intact unit is the preferred method of removal. Mechanically powered tools increase the airborne concentration of lead dust.



Contractors are responsible to ensure that the workers are not exposed to airborne lead dust levels in excess of 0.15 mg/m³. This can be accomplished by:

- Providing respiratory protection and coveralls
- Suppressing dust levels by wetting with amended water, mops or HEPA vacuums
- Using drop-sheets and polyethylene barriers to control dust
- Ensuring the work areas have adequate ventilation
- Provide workers with the means to practice good hygiene practices when leaving the work area

The removal of metallic lead materials should be carried out in accordance with Ontario Regulation 843/90 and the Ontario Ministry of Labour (MOL) draft Proposed Lead Regulation on Construction Projects, both made under the Occupational Health and Safety Act. Any lead-containing materials should also be disposed of in accordance with Ontario Regulation 558 (formerly O. Reg. 347).

In addition, it is recommended that the United States Department of Housing and Urban Development Guideline, of 0.5 % lead (by weight) or 5,000 parts per million (ppm) lead be used as a guideline for determining whether the use of precautions as outlined in the proposed regulation would be required during the above noted operations. Airborne lead dust or fumes should not exceed the MOL TWAEV of 0.15 milligram per cubic metre (mg/m³) during the removal of lead based paints and products.

5.3 Mercury

5.3.1 Survey Findings

Mercury vapour is present inside fluorescent light fixtures. Tubes should be removed intact prior to removing the fixtures. Liquid mercury may also be present inside thermostats and manometers in mechanical equipment.

5.3.2 Survey Recommendations

Prior to removal of fluorescent light fixtures, the tubes should be removed from the fixtures intact to prevent the mercury vapour from escaping. As long as the tubes are not broken, workers will not be exposed to hazardous mercury vapour. Prior to demolition of the facility, mercury-containing materials must be removed as per Ontario Regulation 844/90. During demolition, ensure that the maximum concentration of exposure to airborne mercury does not exceed 0.03 mg Hg/m³ of air.

If applicable, mercury should be collected from thermostats, thermometers, and manometers prior to demolition, however care should be taken to control the release of mercury into the air.



5.4 Silica

5.4.1 Survey Findings

Based on the historic composition of building materials, crystalline silica is present in the following building materials:

- Concrete floor slabs;
- Terra cotta and masonry block walls;
- Mortar; and
- Acoustic ceiling tiles.

5.4.2 Survey Recommendations

Contractors are responsible to ensure workers are not exposed to airborne silica levels in excess of 0.20 mg/m³ when dealing with the above materials. This can be accomplished by:

- Minimize disturbance of the material
- Providing respiratory protection and coveralls
- Suppressing dust levels by wetting with amended water, mops or HEPA vacuums
- Using drop-sheets and polyethylene barriers to control dust
- Ensuring the work areas have adequate ventilation
- Provide workers with the means to practice good hygiene practices when leaving the work area

Use of mechanically powered tools for any demolition work increases the concentration of airborne silica and therefore requires more stringent respiratory protection and controlled work procedures.

5.5 Isocyanates

5.5.1 Survey Findings

At the time of the site inspection, no evidence of isocyanates was noted as part of the structure or finishes.

5.6 Vinyl Chloride Monomer

5.6.1 Survey Findings

At the time of the site inspection, no evidence of vinyl chloride monomer was noted as part of the structure or finishes.

5.7 Benzene

5.7.1 Survey Findings

Benzene may be present in a stable form within roofing materials, paints and adhesives.



5.7.2 Survey Recommendations

It is not expected that benzene concentrations in air will exceed the maximum allowable TWAEV for a worker to benzene (3.0 mg/m³). To minimize potential benzene exposure, apply paints and adhesives in well-ventilated areas.

5.8 Acrylonitrile

5.8.1 Survey Findings

At the time of the site inspection, no evidence of acrylonitrile was noted as part of the structure or finishes.

5.9 Coke Oven Emissions

5.9.1 Survey Findings

At the time of the site inspection, no evidence of coke oven emissions was noted as part of the structure or finishes.

5.10 Arsenic

5.10.1 Survey Findings

At the time of the site inspection, no evidence of arsenic was noted as part of the structure or finishes.

5.10.2 Survey Recommendations

Arsenic or arsenic-containing compounds may be present in stable form in paints and adhesives. It is not expected that arsenic concentrations in air will exceed the maximum allowable TWAEV for a worker to arsenic (0.2 mg/m³). To minimize potential arsenic exposure, apply paints and adhesives in well-ventilated areas.

5.11 Ethylene Oxide

5.11.1 Survey Findings

At the time of the site inspection, no evidence of ethylene oxide was noted in the survey.

5.12 Mould

5.12.1 Survey Findings

At the time of the site inspection, evidence of mould was noted on the chiller pipe and fitting insulation in functional space # 2015, which covers rooms; 315, 313, 312, 312A,B,C,D, 308 and 306.



5.12.2 Survey Recommendations

Oakhill recommend that fungal laboratory sampling be added to the scope of work for this project in the next fiscal year. It is important to identify the type of mould fungus present and mould growth.

Continued diligence is recommended to avoid scenarios, which can support fungi growth specifically: water in the presence of cellulose-based surfaces. There must be moisture (such as leaking pipes, cracked window seals, etc.) as well as an indoor substrate (such as the paper layer of drywall, wood, potted plants, etc.) to support fungal growth. Simply replacing the substrate is not a solution to the problem. The root cause is required to be identified.

6.0 CLOSURE

This report has been prepared for the sole benefit of the National Research Council of Canada.

The conclusions presented represent the best judgement of the assessor based on current environmental standards and on the site conditions observed from January 12th to January 18th, 2007, and on March 23rd, 2007. Due to the nature of the investigation and the limitations of the available data, the assessor cannot warrant against undiscovered environmental liabilities. It is possible that additional, concealed designated substances may become evident during demolition activities.

Should additional information become available, Oakhill requests that this information be brought to our attention so that we may re-assess the conclusions presented herein.

We trust that the report meets your current requirements. Should you have any questions or concerns regarding the above, please do not hesitate to contact the undersigned.

Oakhill Environmental Inc.

Fil Barillaro, M.A.S.c., P.Eng.
Project Manager

APPENDIX A

DESIGNATED SUBSTANCES BACKGROUND INFORMATION

Acrylonitrile

Acrylonitrile is regulated in Ontario under Regulation 835/90 of the Occupational Health and Safety Act. Acrylonitrile is a clear liquid that may be colourless or yellow and that readily reacts with other chemicals to produce long, chain-like molecules (polymers). Acrylonitrile-based polymers are used to produce nitrile rubbers, plastics, acrylic fibres, coatings and adhesives. Workers are typically exposed to acrylonitrile at manufacturing facilities that produce the aforementioned products through inhaling its vapour, direct skin contact, or through ingestion. Although acrylonitrile may be present in some of the building materials, including adhesives and coatings, the chemical will likely be bonded in the polymer form. Therefore, it is not expected that an adverse exposure to acrylonitrile will occur unless the building materials are heated to extreme temperatures. Acrylonitrile vapours may become released from the acrylonitrile-based polymers during a process where high temperatures are applied. Acrylonitrile is classified as *possibly carcinogenic to humans (Group 2b)* as evidence from long-term epidemiological studies since 1980 is conflicting. It is not expected that acrylonitrile concentrations in the air will exceed the maximum allowable time weighted average exposure value (TWAEV) for a worker to acrylonitrile (4.3 mg/m³).

Arsenic

Arsenic is regulated in Ontario under Regulation 836/90 of the Occupational Health and Safety Act. The presence of arsenic in the paint coating on interior and exterior finishes is possible. There are no regulated procedures for the removal of paint containing arsenic. If the paint does not contain lead, but does contain arsenic, the comments concerning lead paint, discussed in below, are expected to address the potential arsenic emissions. As the painted surfaces will be handled as per the proposed lead regulation, it is not expected that arsenic concentrations in the air will exceed the maximum allowable TWAEV for a worker to arsenic (0.2 mg/m³). Human health studies from Argentina and Chile have concluded that arsenic ingestion can result in increased risk of bladder and lung cancer. Non-cancer effects include skin lesions and chronic respiratory disease.

Asbestos

The term "asbestos" describes six naturally occurring fibrous minerals, namely chrysotile, amosite, crocidolite, tremolite, anthophyllite and actinolite. Of the six forms of asbestos, chrysotile (white asbestos), amosite (brown asbestos) and crocidolite (blue asbestos) are the most commonly used. Asbestos has been known to man for centuries and has been used in literally hundreds of products. Asbestos was used because it is strong, insulates well, and resists fire and corrosion.

The Regulation for Asbestos, Ontario Regulation 278/05, made under the Occupational Health and Safety Act defines asbestos as any of the following fibrous silicates:

- Actinolite, Amosite, Anthophyllite, Chrysotile, Crocidolite and Tremolite.

It is important to note that asbestos is defined further as either "friable" or "non-friable". O. Reg. 278/05 defines friable as:

"friable material" means material that,

- *when dry, can be crumbled, pulverized or powdered by hand pressure, or*
- *is crumbled, pulverized or powdered;*

Non-friable is any material that doesn't fit the criteria for friable. Essentially, any material that cannot be *crumbled, pulverized or powdered by hand pressure or is not crumbled, pulverized or powdered.*

The distinction between whether an asbestos containing material (ACM) is friable or non-friable is a notable characteristic as the *'friability'* of the ACM translates the **potential** risk of producing an airborne fibre release. Non-friable ACM's offer far less potential risk of producing an airborne fibre release. These materials should not be cut or shaped using power tools, because this procedure allows for the release of asbestos fibres.

Materials that contain asbestos are commonly referred to as ACM's. O. Reg. 278/05, defines an ACM as:

- *material that contains 0.5 per cent or more asbestos by dry weight;*

The Revised Regulations of Ontario (1990), Regulation 347 (The General Waste Regulation) requires the disposal of asbestos waste in a double sealed container, properly labelled and free of cuts, tears or punctures. The waste must be disposed of in a licensed waste facility, which has been properly notified of the presence of asbestos waste. The federal "Transportation of Dangerous Goods Act" covers the transport of asbestos waste to the disposal site. Asbestos waste is to be handled by a licensed waste hauler.

Asbestos is typically found in plaster, mechanical insulation, gaskets, thermal insulation on pipes, refractory material, roofing felts, floor tiles, ceiling tiles and parging, heat resistant panels, incandescent light fixture reflector plates, and any other material requiring a high degree of durability or thermal resistance. The common use of potential friable (breakable by hand) ACMs in construction ceased voluntarily in the mid 1970s; however, the spray application of asbestos-containing fireproofing was not prohibited until 1986. The airborne maximum allowable TWAEV for a worker to asbestos depends on the type of asbestos, they include, amosite (0.1 f/cc), crocidolite (0.1 f/cc) and other forms of asbestos (1.0 f/cc). Asbestos fibres cumulate in the lungs. Human health effects are proportional to exposure. Studies show long term or high dose exposure can result in scarring of the lung and restricted breathing. Mesothelioma (cancer of the pleural lining) and other lung cancers are also related to asbestos exposure.

Benzene

Benzene is regulated in Ontario under Regulation 839/90 of the Occupational Health and Safety Act Historically; benzene has been produced as a by-product of coal gasification and metallurgical coke production in steel making. The light oil product from such processes contains benzene, toluene, ethyl benzene and xylene, and these components are separated by distillation. Today, most benzene is produced from the refining of petroleum.

Benzene has applications as a solvent in synthetic rubber manufacturing and processing, and in paints, varnishes, stains, adhesives, roofing materials and sealants. The use of benzene in tire and other rubber goods manufacturing and as a solvent and component of paints and adhesives has declined considerably as a result of concerns about workplace exposure. Nevertheless, it is often present in trace quantities in petroleum and aromatic solvents, some of which have replaced benzene in many uses. Benzene is also a minor component of gasoline sold in Canada.

The maximum allowable TWAEV for a worker to benzene is 3 mg/m^3 . Based on the age of the facility, it is possible that benzene was present in the paints, adhesives and roofing materials used during the original construction of the facilities. However, over time, the benzene component typically volatilizes out of the paints, solvents and roofing bitumens and is released into the ambient air. Therefore, it is likely that only trace levels of benzene presently exist in these building materials. It is not expected that benzene emissions from any existing building materials on site will exceed the allowable TWAEV.

Exposure to benzene can range in severity from nausea to suppression of the immune system and death. Long-term exposure to benzene can potentially result in Acute Myeloid Leukemia, Secondary Aplastic Leukemia and damage to the reproductive system.

Ethylene Oxides

Ethylene Oxides are regulated in Ontario under Regulation 841/90 of the Occupational Health and Safety Act. Ethylene oxide is a common by-product of fumigation or sterilization procedures. The airborne maximum allowable TWAEV for a worker to Ethylene Oxides is 1.8 mg/m^3 . Acute exposure may result in vomiting, shortness of breath and dizziness. Chronic exposure has been associated with the occurrence of cancer, reproductive effects, mutagenic changes and neurotoxicity.

Isocyanates

Isocyanates is regulated in Ontario under Regulation 842/90 of the Occupational Health and Safety Act. Isocyanates are a class of chemicals used in the manufacture of certain types of plastics, foams and roof insulation. The Isocyanate (-CNO) group reacts very readily with certain other types of molecules, a property responsible for the usefulness of Isocyanates in industry. Due to the high reactivity of the Isocyanate group, exposure to Isocyanates can result in primary irritation, sensitization and hypersensitivity reactions. The respiratory system, the eyes and the skin are the main areas affected by exposure. Isocyanates in their initial form are found as a vapour, a mist, or a dust which become airborne and then taken into the body. Once the Isocyanates are chemically bonded to other chemicals during manufacturing processes, the Isocyanates are not readily available to become airborne unless heated. Therefore, Isocyanate exposure is not expected to be a concern as long as the burning of plastics, foams, and insulation is not carried out. The airborne maximum allowable TWAEV for a worker to Isocyanates is 0.005 ppm.

Lead

Lead is regulated in Ontario under Regulation 843/90 of the Occupational Health and Safety Act. The Ontario Ministry of Labour (MOL) draft Proposed Lead Regulation on Construction Projects, made under the Occupational Health and Safety Act, May 5, 1995, states that the removal of lead paint is not required unless work on these materials are likely to produce airborne lead dust or fumes, for example during welding, torch cutting, sanding and sand blasting. If these operations are likely to occur during building renovations or demolition, it is recommended that the removal of lead paint be carried out in accordance with procedures outlined in the proposed regulation.

Based on conversations with the MOL, it is recommended that the United States Department of Housing and Urban Development Guideline, of 0.5 % lead (by weight) or 5,000 parts per million (ppm) lead be used as a guideline for determining whether the use of precautions as outlined in the proposed regulation would be required during the above noted operations. Airborne lead dust or fumes should not exceed the MOL TWAEV of 0.15 milligram per cubic metre (mg/m^3) during the removal of lead based paints and products.

Lead may be used in its pure metallic form or combined chemically with other elements to form lead compounds. Metallic lead is used to make products such as electric storage batteries, ammunition, lead solder, radiation shields, pipes, and sheaths for electric cables. Metallic lead is sometimes combined with other metals such as copper, tin and antimony as lead alloys for use in the manufacture of a variety of metal products.

Organic lead compounds contain a lead atom covalently bonded to carbon. Common examples of organic lead compounds include lead "soaps" such as lead oleates, high-pressure lubricants, and anti-knock agents in gasoline.

Inorganic lead compounds (or lead salts) result when lead is combined with an element other than carbon. Examples are lead oxide, lead chromate, lead carbonate and lead nitrate. Inorganic lead compounds may occur as solids or in solutions, and are used in insecticides, pigments, paints, frits, glasses, plastics, and rubber compounds.

Lead may affect the health of workers if it is in a form that may be inhaled, ingested or absorbed through the skin. Lead dust consists of small, solid particles of metallic lead or lead compounds that are generated by sanding, grinding, polishing, and sawing operations. Lead fume is produced in significant amounts when solid lead or materials containing lead are heated to temperatures above 500° C, as in welding and flame cutting or burning.

Mercury

Mercury is regulated in Ontario under Regulation 844/90 of the Occupational Health and Safety Act. Mercury is commonly found in buildings as mercury vapour lighting, in thermometers, thermostats and some electrical switches. Mercury can also be found in minor amounts in fluorescent lamp tubes and in paints and adhesives.

Mercury, or mercury vapour within light fixtures, thermometers, thermostats and electrical switches poses no risk to workers or occupants provided the mercury containers remain intact and undisturbed. Prior to demolition, remove mercury containers and store in a safe location. The airborne maximum allowable TWAEV for a worker to mercury is 0.05 mg/m³.

Short-term exposure to mercury is a rare occurrence due to the more stringent controls. Historically, short-term exposure to high concentrations of mercury vapour included: harmful effects of the nervous, respiratory and digestive systems and the kidneys.

Silica

Silica is regulated in Ontario under Regulation 845/90 of the Occupational Health and Safety Act. Silica, also referred to as free crystalline silica, is found in concrete, cement, mortar, ceramic wall and floor tiles, stucco finishes and acoustic ceiling tiles. Prolonged exposure to, and inhalation of free crystalline silica, may result in respiratory disease known as silicosis, which is characterised by progressive fibrosis of the inner lung tissue and marked shortness of breath or impaired lung function. The maximum TWAEV for airborne Silica dust is 0.20 mg/m³.

Precautions should be taken during work on concrete (coring etc.) and ceiling tiles to minimize exposure to free crystalline silica dust. Silica exposure should not exceed the MOL TWAEV of 0.20 milligrams per cubic metre (mg/m³) during demolition activities. This can be achieved by:

- . providing workers with respiratory protection;
- . wetting the surface of the materials to prevent dust emissions;
- . provide workers with facilities to properly wash prior to exiting the work area.

Vinyl Chloride

Vinyl Chloride is regulated in Ontario under Regulation 846/90 of the Occupational Health and Safety Act. Vinyl chloride is found in many applications in buildings such as plumbing pipes, protective coatings on insulated pipes and interior finishes (i.e., vinyl baseboard trim). Vinyl chlorides in the above materials are bound in a solid matrix and are unlikely to become airborne such that it would exceed the maximum allowable TWAEV of 5.2 mg/m³.

Human health effects from long-term exposure include: cancer of the liver, damage to the immune and reproductive systems.

Fungi

There is essentially no fungus-free environment in our daily lives. Fungal spores are abundant in outdoor air and exposure to fungi occurs commonly in indoor environments.

Continued cleaning diligence is recommended to avoid scenarios which can support fungi growth such as water in the presence of cellulose-based surfaces. There must be a moisture or water problem to support fungal growth.

APPENDIX B

ANALYTICAL RESULTS – ASBESTOS



Certificate of Analysis

AGAT WORK ORDER: 07T205636

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Bill McGovern

Bulk Asbestos

DATE SAMPLED:	DATE RECEIVED: January 17 2007			DATE REPORTED: January 29 2007			SAMPLE TYPE: Other				
	Unit	G / S	M.D.L.	1A 645663	1B 645667	1C 645668	2A 645669	2B 645670	2C 645671	3A 645672	3B 645673
Asbestos	%		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Unit	G / S	M.D.L.	3C 645674	3D 645675	3E 645676	4A 645677	4B 645678	4C 645679	5A 645680	5B 645681
Asbestos	%		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Unit	G / S	M.D.L.	6A 645682	6B 645684	6C 646154	7A 646155	7B 646156	7C 646157	8 646158	9A 646159
Asbestos	%		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	20	<0.5
	Unit	G / S	M.D.L.	9B 646160	9C 646161	10 646162	11 646163	12 646164	13 646165	14A 646166	14B 646176
Asbestos	%		0.5	<0.5	<0.5	10	15	10	Trace	<0.5	<0.5
	Unit	G / S	M.D.L.	14C 646168	15 646169	16A 646170	16B 646171	16C 646172	17A 646173	17B 646175	18 646176
Asbestos	%		0.5	<0.5	10	<0.5	<0.5	<0.5	<0.5	<0.5	12

Certified By: _____



Certificate of Analysis

AGAT WORK ORDER: 07T205636

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Bill McGovern

Bulk Asbestos

DATE SAMPLED:

DATE RECEIVED: January 17 2007

DATE REPORTED: January 29 2007

SAMPLE TYPE: Other

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

645663 Condition of sample was satisfactory at time of arrival in laboratory.
645667 Condition of sample was satisfactory at time of arrival in laboratory.
645668 Condition of sample was satisfactory at time of arrival in laboratory.
645669 Condition of sample was satisfactory at time of arrival in laboratory.
645670 Condition of sample was satisfactory at time of arrival in laboratory.
645671 Condition of sample was satisfactory at time of arrival in laboratory.
645672 Condition of sample was satisfactory at time of arrival in laboratory.
645673 Condition of sample was satisfactory at time of arrival in laboratory.
645674 Condition of sample was satisfactory at time of arrival in laboratory.
645675 Condition of sample was satisfactory at time of arrival in laboratory.
645676 Condition of sample was satisfactory at time of arrival in laboratory.
645677 Condition of sample was satisfactory at time of arrival in laboratory.
645678 Condition of sample was satisfactory at time of arrival in laboratory.
645679 Condition of sample was satisfactory at time of arrival in laboratory.
645680 Condition of sample was satisfactory at time of arrival in laboratory.
645681 Condition of sample was satisfactory at time of arrival in laboratory.
645682 Condition of sample was satisfactory at time of arrival in laboratory.
645684 Condition of sample was satisfactory at time of arrival in laboratory.
646154 Condition of sample was satisfactory at time of arrival in laboratory.
646155 Condition of sample was satisfactory at time of arrival in laboratory.
646156 Condition of sample was satisfactory at time of arrival in laboratory.
646157 Condition of sample was satisfactory at time of arrival in laboratory.
646158 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

646159 Condition of sample was satisfactory at time of arrival in laboratory.
646160 Condition of sample was satisfactory at time of arrival in laboratory.
646161 Condition of sample was satisfactory at time of arrival in laboratory.
646162 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

646163 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

646164 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

646165 Condition of sample was satisfactory at time of arrival in laboratory.

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 07T205636

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Bill McGovern

Bulk Asbestos

DATE SAMPLED:

DATE RECEIVED: January 17 2007

DATE REPORTED: January 29 2007

SAMPLE TYPE: Other

646166 Condition of sample was satisfactory at time of arrival in laboratory.
646167 Condition of sample was satisfactory at time of arrival in laboratory.
646168 Condition of sample was satisfactory at time of arrival in laboratory.
646169 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

646170 Condition of sample was satisfactory at time of arrival in laboratory.
646171 Condition of sample was satisfactory at time of arrival in laboratory.
646172 Condition of sample was satisfactory at time of arrival in laboratory.
646173 Condition of sample was satisfactory at time of arrival in laboratory.
646175 Condition of sample was satisfactory at time of arrival in laboratory.
646176 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: amosite

Certified By: _____



Certificate of Analysis

AGAT WORK ORDER: 07T206733

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Bulk Asbestos

DATE SAMPLED: January 17 2007

DATE RECEIVED: January 24 2007

DATE REPORTED: January 31 2007

SAMPLE TYPE: Other

	Unit	G / S	M.D.L.	M19 - 17C 648445	M19 - 17D 648446	M19 - 17E 648447	M19 - 17F 648448	M19 - 19 648449	M19 - 20A 648450	M19 - 21A 648453	M19 - 21B 648454
Asbestos	%		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	15	<0.5	<0.5
	Unit	G / S	M.D.L.	M19 - 21C 648455	M19 - 22 648456	M19 - 23A 648457	M19 - 23B 648458	M19 - 23C 648459	M19 - 23D 648460	M19 - 23E 648461	M19 - 24A 648462
Asbestos	%		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Unit	G / S	M.D.L.	M19 - 24B 648463	M19 - 24C 648464	M19 - 25A 648465	M19 - 25B 648466	M19 - 25C 648467	M19 - 25D 648468	M19 - 25E 648469	M19 - 25F 648470
Asbestos	%		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	Unit	G / S	M.D.L.	M19 - 25G 648471	M19 - 26A 648472	M19 - 27 648475	M19 - 28A 648476	M19 - 29A 648479	M19 - 29B 648480	M19 - 29C 648481	M19 - 30A 648482
Asbestos	%		0.5	<0.5	2	20	2	<0.5	<0.5	<0.5	Trace
	Unit	G / S	M.D.L.	M19 - 31A 648485	M19 - 31B 648486	M19 - 31C 648487	M19 - 32A 648488	M19 - 32B 648489	M19 - 32C 648490	M19 - 17G 648540	
Asbestos	%		0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	

Certified By: _____



Certificate of Analysis

AGAT WORK ORDER: 07T206733

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Bulk Asbestos

DATE SAMPLED: January 17 2007

DATE RECEIVED: January 24 2007

DATE REPORTED: January 31 2007

SAMPLE TYPE: Other

Comments: M.D.L - Method Detection Limit; G / S - Guideline / Standard

648445 Condition of sample was satisfactory at time of arrival in laboratory.
648446 Condition of sample was satisfactory at time of arrival in laboratory.
648447 Condition of sample was satisfactory at time of arrival in laboratory.
648448 Condition of sample was satisfactory at time of arrival in laboratory.
648449 Condition of sample was satisfactory at time of arrival in laboratory.
648450 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

648453 Condition of sample was satisfactory at time of arrival in laboratory.
648454 Condition of sample was satisfactory at time of arrival in laboratory.
648455 Condition of sample was satisfactory at time of arrival in laboratory.
648456 Condition of sample was satisfactory at time of arrival in laboratory.
648457 Condition of sample was satisfactory at time of arrival in laboratory.
648458 Condition of sample was satisfactory at time of arrival in laboratory.
648459 Condition of sample was satisfactory at time of arrival in laboratory.
648460 Condition of sample was satisfactory at time of arrival in laboratory.
648461 Condition of sample was satisfactory at time of arrival in laboratory.
648462 Condition of sample was satisfactory at time of arrival in laboratory.
648463 Condition of sample was satisfactory at time of arrival in laboratory.
648464 Condition of sample was satisfactory at time of arrival in laboratory.
648465 Condition of sample was satisfactory at time of arrival in laboratory.
648466 Condition of sample was satisfactory at time of arrival in laboratory.
648467 Condition of sample was satisfactory at time of arrival in laboratory.
648468 Condition of sample was satisfactory at time of arrival in laboratory.
648469 Condition of sample was satisfactory at time of arrival in laboratory.
648470 Condition of sample was satisfactory at time of arrival in laboratory.
648471 Condition of sample was satisfactory at time of arrival in laboratory.
648472 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

648475 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

648476 Condition of sample was satisfactory at time of arrival in laboratory.

Asbestos containing: chrysotile

648479 Condition of sample was satisfactory at time of arrival in laboratory.
648480 Condition of sample was satisfactory at time of arrival in laboratory.

Certified By:



Certificate of Analysis

AGAT WORK ORDER: 07T206733

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Bulk Asbestos

DATE SAMPLED: January 17 2007

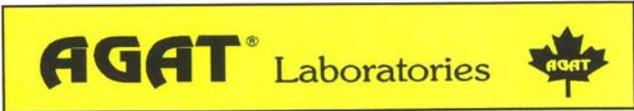
DATE RECEIVED: January 24 2007

DATE REPORTED: January 31 2007

SAMPLE TYPE: Other

648481	Condition of sample was satisfactory at time of arrival in laboratory.
648482	Condition of sample was satisfactory at time of arrival in laboratory.
648485	Condition of sample was satisfactory at time of arrival in laboratory.
648486	Condition of sample was satisfactory at time of arrival in laboratory.
648487	Condition of sample was satisfactory at time of arrival in laboratory.
648488	Condition of sample was satisfactory at time of arrival in laboratory.
648489	Condition of sample was satisfactory at time of arrival in laboratory.
648490	Condition of sample was satisfactory at time of arrival in laboratory.
648540	Condition of sample was satisfactory at time of arrival in laboratory.

Certified By: _____



Certificate of Analysis

5623 McADAM ROAD
 MISSISSAUGA, ON
 CANADA L4Z 1N9

PH: (905)501-9998
 FAX: (905)501-0589
<http://www.agatlabs.com>

AGAT WORK ORDER: 07T216831
 PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Bulk Asbestos											
DATE SAMPLED: Mar 23, 2007			DATE RECEIVED: Mar 26, 2007			DATE REPORTED: Apr 02, 2007			SAMPLE TYPE: Other		
Asbestos	Unit	G / S	M.D.L	M19-05c 674208	M19-13b 674212	M19-13c 674215	M19-19b 674216	M19-19c 674217	M19-23f 674218	M19-23g 674219	M19-33a 674220
	%		0.5	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Asbestos	Unit	G / S	M.D.L	M19-33b 674221	M19-33c 674222	M19-34a 674223	M19-34b 674224	M19-34c 674225			
	%		0.5	N.D.	N.D.	N.D.	N.D.	N.D.			

Comments: M.D.L - Method Detection Limit; G / S - Guideline / Standard
 674208-674225 Condition of sample was satisfactory at time of arrival in laboratory.

"ND" - Not Detected

Certified By: _____

APPENDIX C

ANALYTICAL RESULTS – LEAD



Certificate of Analysis

AGAT WORK ORDER: 07T205700

PROJECT NO: NRC

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Bill McGovern

Lead in Paint

DATE SAMPLED:

DATE RECEIVED: January 17 2007

DATE REPORTED: January 25 2007

SAMPLE TYPE: Other

	Unit	G / S	M.D.L.	L1 645856	L2 645857	L3 645858	L4 645859	L5 645860	L6 645861	L7 645862	L8 645863
Lead	µg/g		7.0	1800	3930	1720	761	18200	8200	68.4	<7.0

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: _____

Jacky Takewski



Certificate of Analysis

AGAT WORK ORDER: 07T206732

PROJECT NO: PR-06-039

CLIENT NAME: OAKHILL ENVIRONMENTAL

ATTENTION TO: Fil Barillo

Lead in Paint

DATE SAMPLED: January 17 2007

DATE RECEIVED: January 24 2007

DATE REPORTED: February 02 2007

SAMPLE TYPE: Paint

	Unit	G / S	M.D.L.	M19 - L9 648551	M19 - L10 648554
Lead	µg/g		7.0	642	252

Comments: M.D.L. - Method Detection Limit; G / S - Guideline / Standard

Certified By: _____

Jacky Takewhi

APPENDIX D

PHOTOGRAPHS OF DAMAGED ACM

M-19 ASBESTOS PHOTOGRAPH LOG

Photo #	Photograph	Function Space #	Comments
01		G001	<p>Damaged firewall.</p> <p>5 encapsulations are required.</p>
02		G001	<p>Damaged firewall.</p> <p>Removal of approximately 1m².</p>
03		G001	<p>Damaged mud joint compound fitting insulation on the steam system. Two encapsulations are required.</p>
04		G001	<p>Damaged aircell pipe insulation on the steam system.</p> <p>Removal of 0.3 metres of aircell pipe insulation and 1 MJC elbow.</p>
05		G001	<p>Encapsulation of aircell pipe insulation is required on the steam system.</p>
06		G001	<p>Two minor encapsulations of 'cracked' aircell pipe insulation on the steam system.</p>

Photo #	Photograph	Function Space #	Comments
07		G001	Damaged aircell pipe insulation and MJC fitting insulation on the domestic hot water system. Four encapsulations are required in G001.
08		G001	Damaged MJC fitting on the domestic cold water system. Five encapsulations are required in G001.
09		G001	Encapsulate open aircell pipe insulation end on condensate system.
10		G002	Encapsulate 1 damaged MJC fitting on the domestic hot-water system.
11		G002	Encapsulate 1 damaged MJC fitting on the domestic cold-water system
12		G002	Encapsulate 1 damaged MJC fitting on the domestic cold-water system

Photo #	Photograph	Function Space #	Comments
13		G002	Two encapsulations of open air-cell pipe insulation ends on two steam lines.
14		G002	Two encapsulations of open air-cell pipe insulation ends on two domestic hot-water lines.
15		G009	Encapsulation (1) of damaged MJC fitting on the steam system is required.
16		G009	Encapsulation of 0.2 metres of damaged air-cell pipe insulation on the condensate system.
17		G009	Encapsulation (1) of damaged MJC fitting on the condensate system.
18		G009	Encapsulation of damaged air-cell pipe insulation (0.2 metres) on the domestic cold water system.
19		G009	Encapsulation (1) of damaged MJC fitting on the domestic cold water system.

Photo #	Photograph	Function Space #	Comments
20		1002	Encapsulation of 0.2 metres of damaged aircell pipe insulation on the condensate system.
21		1014	Damaged area on the hot water heating system requires the removal of 0.1 metres of aircell pipe insulation and the encapsulation of (2) open ends.
22		1015	Damaged parging on chiller elbows requires (2) removals.
23		1015	Damaged aircell pipe insulation on the hot water heating system requires encapsulation of 0.1 metres.
24		2002	Damaged MJC fitting on the condensate system requires (1) encapsulation.
25		2002	Damaged MJC fitting on the steam system requires (1) encapsulation.

Photo #	Photograph	Function Space #	Comments
26		2003	Damaged MJC fitting on the domestic cold water system requires (1) encapsulation.
27		2002	Damaged MJC fitting on the steam system requires (1) encapsulation.
28		2006	Damaged MJC fitting on the steam system requires (1) encapsulation.
29		2009	Damaged MJC fitting on the condensate system requires (1) encapsulation.
30		2010	Damaged MJC fittings on the steam system requires (2) encapsulations.
31		2010	Damaged MJC fitting on the steam system requires (1) encapsulation.
32		2010	Damaged aircell pipe insulation (crack) on the steam system requires (1) encapsulation of a 0.1 metre area.

Photo #	Photograph	Function Space #	Comments
33		2010	Damaged MJC fitting on the condensate system requires (1) encapsulations.
34		SW002	Damaged aircell pipe insulation on the hot water heating system requires (1) encapsulation of a 0.5 metre area.

M-19 MOULD PHOTOGRAPH LOG

Photo #	Photograph	Function Space #	Comments
M01	 A close-up photograph showing a section of a chiller pipe wrapped in white insulation. The insulation is heavily covered with a thick, dark, fuzzy growth of mould. The pipe itself is metallic and partially visible through the insulation.	2015	Mould on chiller pipe insulation.

M-19 LEAD PHOTOGRAPH LOG

Photo #	Photograph	Function Space #	Comments
L01	 A photograph showing a horizontal pipe with a 90-degree elbow. The pipe is painted red, but there are significant areas where the red paint has chipped away, revealing a white undercoat. The pipe is set against a light-colored wall.	G001	Red paint on pipe in stockroom over white paint
L02	 A photograph of a red fire-hose cabinet. The cabinet is mounted on a wall. A fire hose is visible, and the red paint on the cabinet appears to be layered over a green paint. The background is a white tiled wall.	G001	Red paint on fire-hose cabinet in stockroom over green paint

APPENDIX E
FLOOR PLANS



LEGEND

- 1001 FUNCTIONAL SPACE #
- AREA NOT INSPECTED (INACCESSIBLE)
- ACM PIPE INSULATION: DOMESTIC HW
- ACM PIPE INSULATION: STEAM
- ACM PIPE INSULATION: CONDENSATE
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: STEAM
- ACM FITTING INSULATION: CONDENSATE
- ACM FITTING INSULATION: HW HEATING
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: DOMESTIC HW
- ACM FITTING INSULATION: CHILLER
- ACM TRANSITE WALL PANEL

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: ts, valves, ends, hangers, etc.

CLIENT

NATIONAL RESEARCH COUNCIL CANADA
ADMINISTRATIVE SERVICES
AND PROPERTY MANAGEMENT
BUILDING M-19
1200 MONTREAL RD.
OTTAWA, ON, K1A 0R6

PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

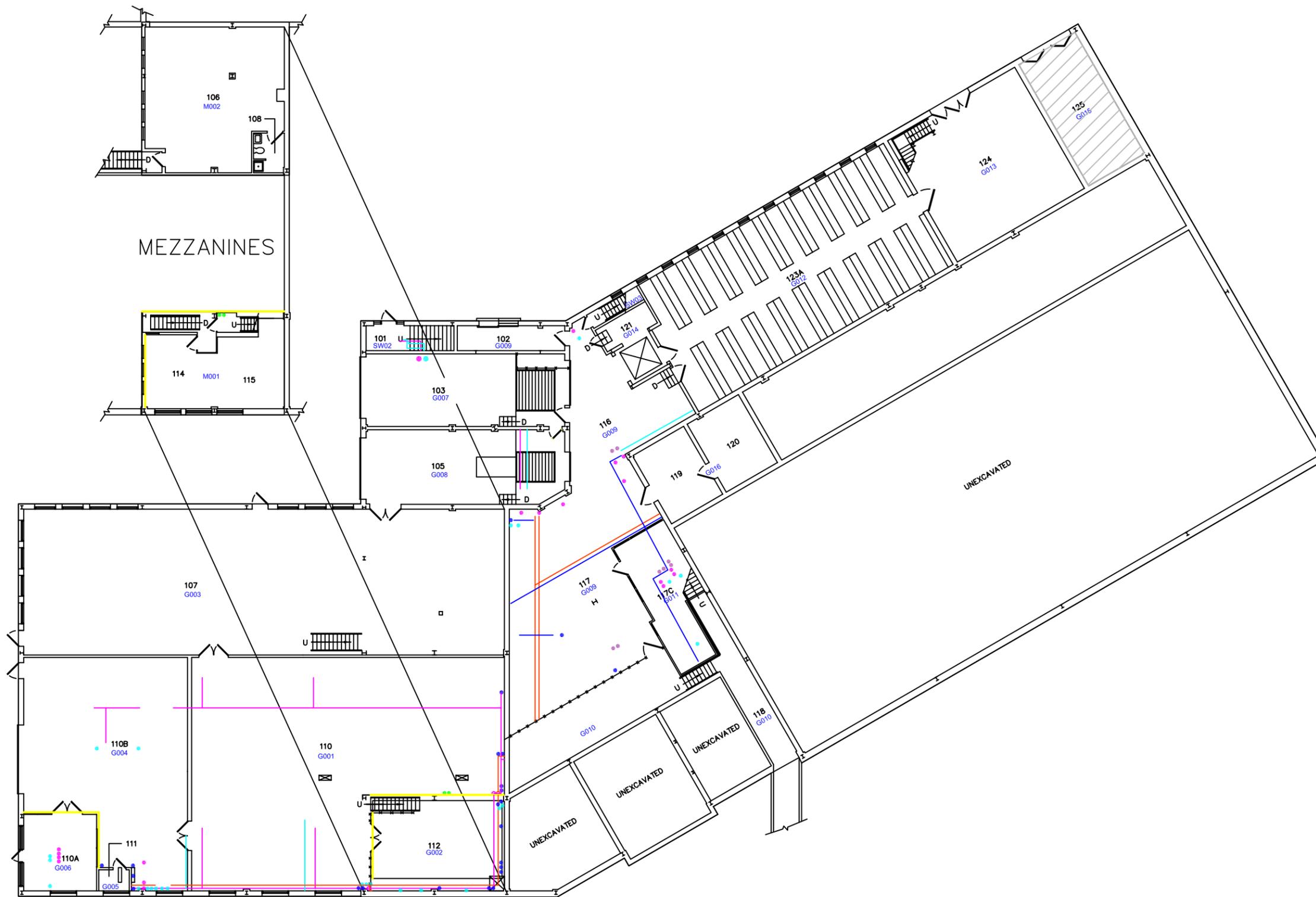
NTS

TITLE

**GROUND
FLOOR
ASBESTOS
LOCATIONS**

SHEET

G-1





LEGEND

- 1001 FUNCTIONAL SPACE #
- AREA NOT INSPECTED (INACCESSIBLE)
- DAMAGED ACM LOCATION
- P# PHOTOGRAPH #
- ACM PIPE INSULATION: DOMESTIC HW
- ACM PIPE INSULATION: STEAM
- ACM PIPE INSULATION: CONDENSATE
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: STEAM
- ACM FITTING INSULATION: CONDENSATE
- ACM FITTING INSULATION: HW HEATING
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: DOMESTIC HW
- ACM FITTING INSULATION: CHILLER
- ACM TRANSITE WALL PANEL

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

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AND PROPERTY MANAGEMENT
BUILDING M-19
1200 MONTREAL RD.
OTTAWA, ON, K1A 0R6

PROJECT
DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

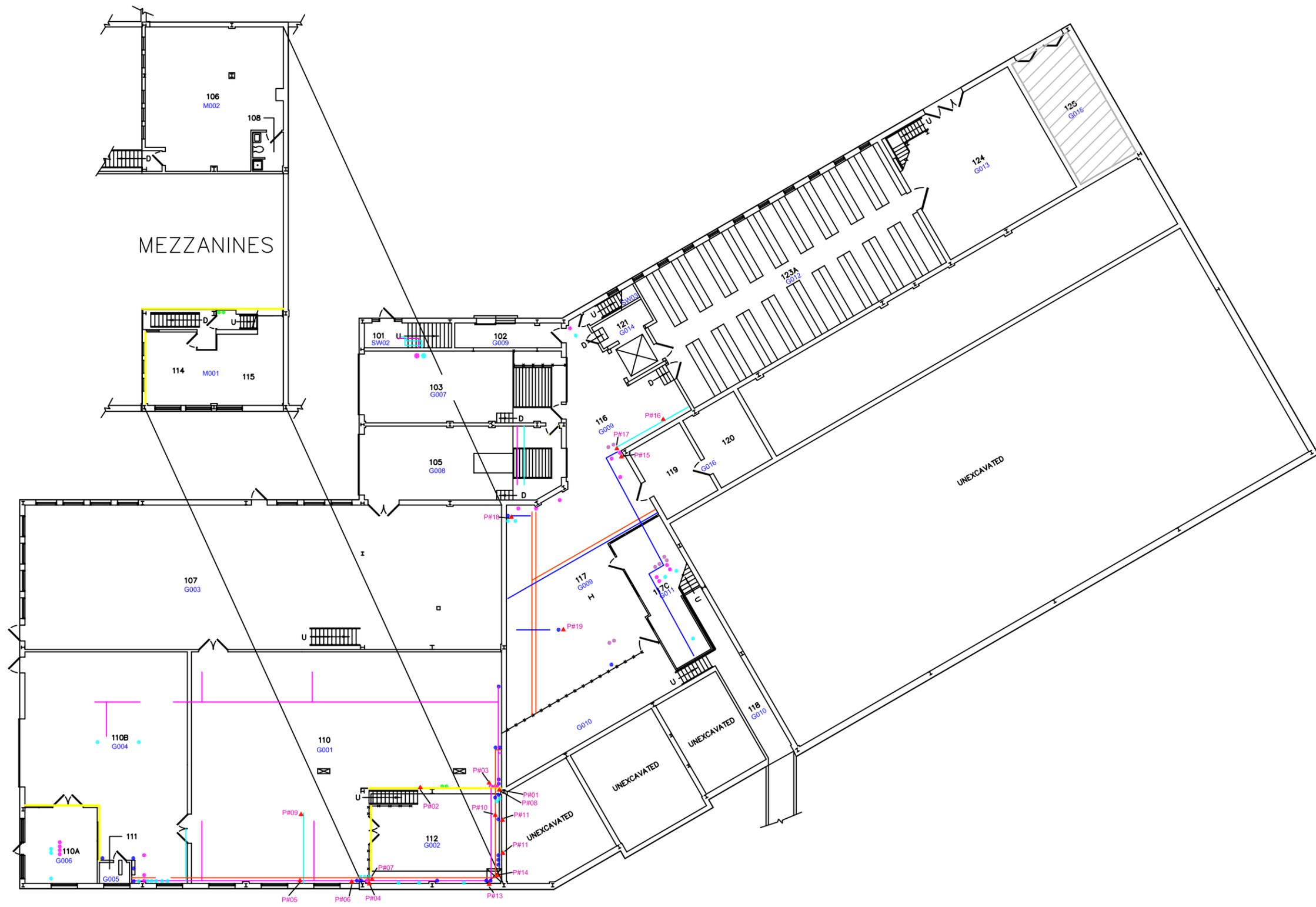
PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
GROUND FLOOR ASBESTOS SURVEY

SHEET
G-2





LEGEND

- 1001 FUNCTIONAL SPACE #
- AREA NOT INSPECTED (INACCESSIBLE)
- SAMPLE LOCATION: NON-ACM
- SAMPLE LOCATION: ACM

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PROJECT
DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
GROUND FLOOR SAMPLE LOCATIONS

SHEET
G-2A





OAKHILL
ENVIRONMENTAL

LEGEND

-  LEAD SAMPLE LOCATION (<5000 ppm)
-  LEAD SAMPLE LOCATION (>5000 ppm)
-  AREA NOT INSPECTED (INACCESSIBLE)

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DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

NTS

TITLE

GROUND FLOOR
LEAD SAMPLE
LOCATIONS

SHEET

G-3





INTERMEDIATE
FLOOR



LEGEND

- 1001 FUNCTIONAL SPACE #
- AREA NOT INSPECTED (INACCESSIBLE)
- ACM PIPE INSULATION: HW HEATING
- ACM FITTING INSULATION: STEAM
- ACM FITTING INSULATION: CONDENSATE
- ACM FITTING INSULATION: HW HEATING
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: CHILLER

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

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AND PROPERTY MANAGEMENT
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OTTAWA, ON, K1A 0R6

PROJECT
DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

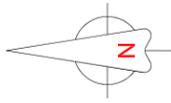
PROJECT NO.
PR-06-39

DATE
MARCH 2007

SCALE
NTS

TITLE
FIRST FLOOR
ASBESTOS
LOCATIONS

SHEET
1-1



LEGEND

- 1001 FUNCTIONAL SPACE #
- ACM PIPE INSULATION: HW HEATING
- ACM PIPE INSULATION: STEAM
- ACM PIPE INSULATION: CONDENSATE
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: STEAM
- ACM FITTING INSULATION: CONDENSATE
- ACM FITTING INSULATION: HW HEATING
- ACM FITTING INSULATION: DOMESTIC CW
- ACM TRANSITE WALL PANEL
- ▨ ACM FLOOR TILE

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

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OTTAWA, ON, K1A 0R6

PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

NTS

TITLE

**SECOND
FLOOR
ASBESTOS
LOCATIONS**

SHEET

2-1

STORAGE
MEZZANINE





LEGEND

- 1001 FUNCTIONAL SPACE #
- ACM CEMENT DECK

NOTE:
ACM filling insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

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1200 MONTREAL RD.
OTTAWA, ON, K1A 0R6

PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

NTS

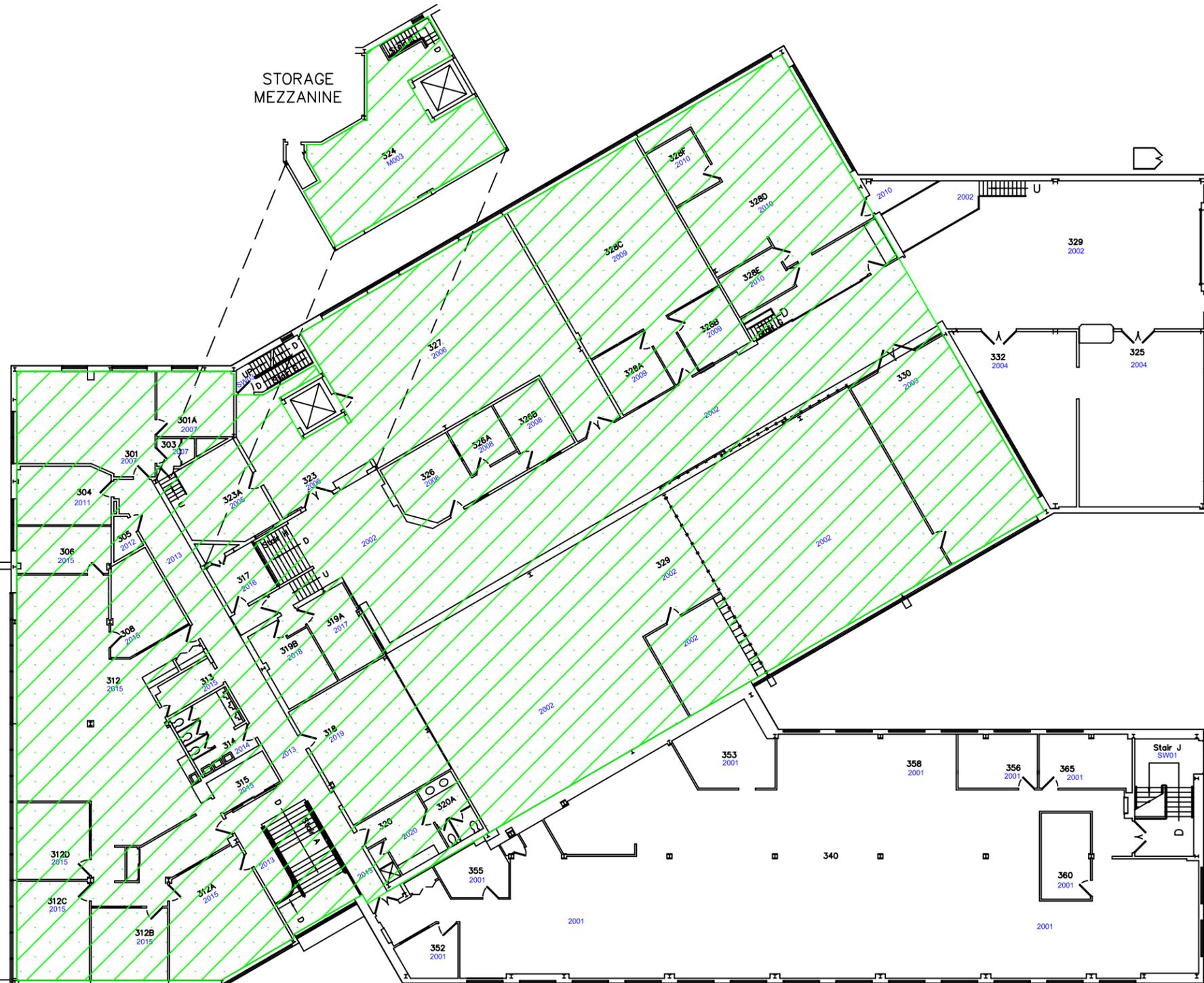
TITLE

SECOND
FLOOR
ACM DECK
LOCATIONS

SHEET

2-1A

STORAGE
MEZZANINE





LEGEND

- 1001 FUNCTIONAL SPACE #
- SAMPLE LOCATION: NON-ACM
- SAMPLE LOCATION: ACM
- ▲ DAMAGED ACM LOCATION
- P# PHOTOGRAPH #
- ACM PIPE INSULATION: HW HEATING
- ACM PIPE INSULATION: STEAM
- ACM PIPE INSULATION: CONDENSATE
- ACM FITTING INSULATION: DOMESTIC CW
- ACM FITTING INSULATION: STEAM
- ACM FITTING INSULATION: CONDENSATE
- ACM FITTING INSULATION: HW HEATING
- ACM FITTING INSULATION: DOMESTIC CW
- ACM TRANSITE WALL PANEL
- ▨ ACM FLOOR TILE

NOTE:
ACM fitting insulation locations are shown only on systems where NON-ACM pipe insulation was found. ONLY ACM ELBOWS are shown. These systems may also have ACM on: t's, valves, ends, hangers, etc.

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PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

NTS

TITLE

**SECOND
FLOOR
ASBESTOS
SURVEY**

SHEET

2-2

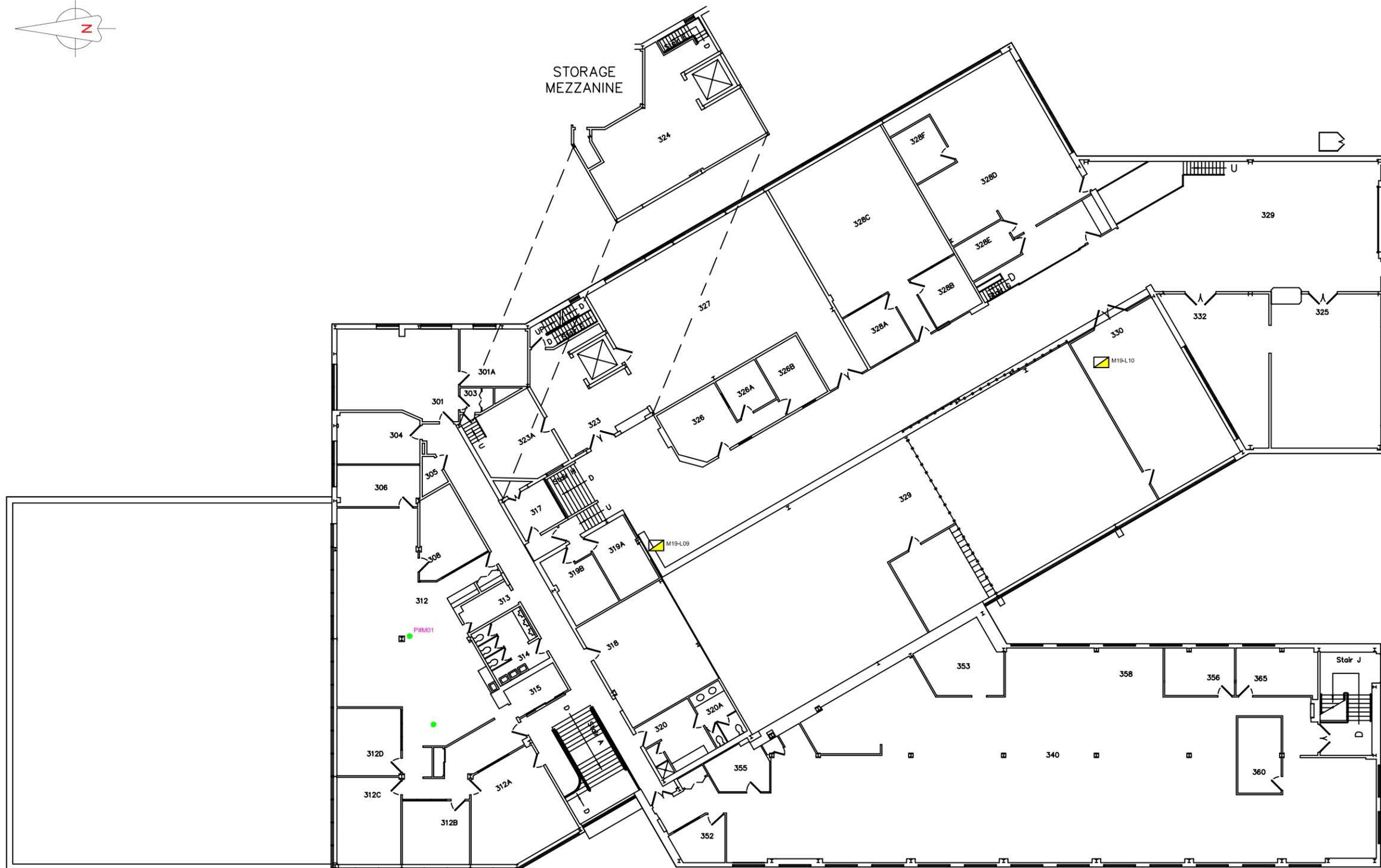




OAKHILL
ENVIRONMENTAL

LEGEND

-  LEAD SAMPLE LOCATION (<5000 ppm)
-  MOULD LOCATION
-  PHOTOGRAPH #



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PROJECT

DESIGNATED SUBSTANCES SURVEY
BUILDING M-19

PROJECT NO.

PR-06-39

DATE

MARCH 2007

SCALE

NTS

TITLE

SECOND FLOOR
LEAD SAMPLES
&
MOULD
LOCATIONS

SHEET

2-3

APPENDIX F
FUNCTIONAL SPACE FORMS



Building: M-19 Date: January 12, 2007 Job #: PR-06-039	Notes: Sheet 1 of 2 - Some areas of the steam system have been replaced with fibreglass. - Steam aircell pipe insulation requires 3 encapsulations and steam MJC fitting insulation requires 5 encapsulations and 1 removal. - Aircell pipe insulation on the condensate system requires 1 encapsulation. - The firewall requires 5 encapsulations for a total area of 1m ² and removal of a bad damaged area of 1m ² .	FS #: G001 (sheet 1 of 2) FS Area: Room 110 storage Inspector: BM & RT
---	--	---

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	11	Firewall	Wall	Y	N	15% Chrysotile	83 m ²	X	--	--	--	X	--	O & M	G-1	01
	11	Firewall	Wall	Y	N	15% Chrysotile	1 m ²	--	X	--	--	X	--	5 encapsulations	G-2	01
	11	Firewall	Wall	Y	N	15% Chrysotile	1 m ²	--	X	--	--	X	--	1 removal	G-2	02
Ceil.	n/a	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	08	Aircell PI	Steam	Y	Y	20% Chrysotile	56 LM	X	--	--	--	X	--	O & M	G-1	--
	08	Aircell PI	Steam	Y	Y	20% Chrysotile	1 LM	--	--	X	--	X	--	3 encapsulations	G-2	05, 06
	10	MJC FI	Steam	Y	Y	10% Chrysotile	21 units	X	--	--	--	X	--	O & M	G-1	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	6 units	--	--	X	--	X	--	5 encapsulations & 1 removal	G-2	03, 04
	n/a	FG PI & FI	Steam	N	--	--	--	--	--	--	--	--	--	Re-insulated areas	--	--
	08	Aircell PI	DHW	Y	Y	20% Chrysotile	29 LM	X	--	--	--	X	--	O & M	G-1	--
	08	Aircell PI	DHW	Y	Y	20% Chrysotile	1 LM	--	--	X	--	X	--	2 encapsulations	G-2	07
	10	MJC FI	DHW	Y	Y	10% Chrysotile	14 units	X	--	--	--	X	--	O & M	G-1	--
	10	MJC FI	DHW	Y	Y	10% Chrysotile	5 units	--	--	X	--	X	--	2 encapsulations	G-2	07
	09	Sweat wrap (with tar paper layer) PI	DHW	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:

- A: All building occupants may have access to this area
- B: Restricted to building staff only
- C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:

- G: ACM is in GOOD condition; No damage
- F: ACM is in FAIR condition; Less than 2% damage
- P: ACM is in POOR condition; Greater than 2% damage

- MJC: Mud Joint Compound
- PI: Pipe Insulation
- FI: Fitting Insulation
- FG: Fibreglass
- DI: Duct Insulation



Building: M-19 Date: March 23, 2007 Job #: PR-06-039	Notes: - DCW: requires two encapsulations of aircell pipe insulation for a total of 0.2 LM and two encapsulations of damaged MJC fitting insulation (elbows) - Steam: requires two encapsulations of aircell pipe insulation for a total of 0.2 LM - DHW: requires one encapsulation of damaged MJC fitting insulation	FS #: G002 FS Area: Room 112 Storage Inspector: BM, RT
---	--	--

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Walls	N	--	--	--	--	--	--	--	--	--	--	--	--
	18	Transite panel	Wall	Y	N	12% Amosite	17 m ²	X	--	--	X	--	--	O & M	G-1	--
Ceil.	n/a	Concrete	Ceil.	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	08	Aircell PI	DHW	Y	Y	20% Chrysotile	13 LM	X	--	--	X	--	--	O & M	G-1	--
	08	Aircell PI	DHW	Y	Y	20% Chrysotile	0.2 LM	--	X	--	X	--	--	2 encapsulations	G-2	14
	10	MJC FI	DHW	Y	Y	10% Chrysotile	1 unit	--	X	--	X	--	--	1 encapsulation	G-2	10
	08	Aircell PI	Steam	Y	Y	20% Chrysotile	13 LM	X	--	--	X	--	--	O & M	G-1	--
	08	Aircell PI	Steam	Y	Y	20% Chrysotile	0.2 LM	--	X	--	X	--	--	2 encapsulations	G-2	13
	n/a	FG PI	Conden.	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	Conden.	Y	Y	10% Chrysotile	5 units	X	--	--	X	--	--	O & M	G-1	--
	n/a	FG PI + FI	DCW													
	10	MJC FI	DCW	Y	Y	10% Chrysotile	7 unit	X	--	--	X	--	--	O & M	G-1	--
	10	MJC FI	DCW	Y	Y	10% Chrysotile	2 unit	--	X	--	X	--	--	2 encapsulations	G-2	11, 12
	n/a	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Styrofoam PI + FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI + FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:

- A: All building occupants may have access to this area
- B: Restricted to building staff only
- C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:

- G: ACM is in GOOD condition; No damage
- F: ACM is in FAIR condition; Less than 2% damage
- P: ACM is in POOR condition; Greater than 2% damage

- MJC: Mud Joint Compound
- PI: Pipe Insulation
- FI: Fitting Insulation
- FG: Fibreglass
- DI: Duct Insulation



Building: M-19 Date: January 12, 2007 Job #: PR-06-039	Notes: - No ACM was observed. - Sample M19-014 (a-c) and M19-L4 were collected here.	FS #: G003 FS Area: Room 107 Publications/Sales & Distribution Inspector: BM & RT
---	---	--

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	14	12" x 12" FT beige	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Concrete	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.		n/a														
Other	n/a	FG PI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19	Notes: -Samples M19-15 and M19-18 were collected here. - All ACM's in good condition.	FS #: G004
Date: January 12, 2007		FS Area: Room 110B
Job #: PR-06-039		Inspector: BM & RT

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	18	Transite panel	Wall	Y	Y	12% Chrysotile	13 m ²	X	--	--	--	X	--	O & M	G-1	--
	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Concrete Deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	08	Aircell PI	Conden	Y	Y	20% Chrysotile	4 LM	X	--	--	--	X	--	O & M	G-1	--
	n/a	FG PI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--
	15	MJC FI	Conden	Y	Y	10% Chrysotile	15 units	X	--	--	--	X	--	O & M	G-1	--
	09	Sweat wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	15	MJC FI	DCW	Y	Y	10% Chrysotile	6 units	X	--	--	--	X	--	O & M	G-1	--
	n/a	FG PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	08	Aircell PI	DHW	Y	Y	20% Chrysotile	3 LM	X	--	--	--	X	--	O & M	G-1	--
	n/a	FG	DHW	N	--	--	--	--	--	--	--	--	--	--	--	--
	15	MJC FI	Steam	Y	Y	10% Chrysotile	19 units	X	--	--	--	X	--	O & M	G-1	--
	08	Aircell PI	Steam	Y	Y	20% Chrysotile	6 LM	X	--	--	--	X	--	O & M	G-1	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 12, 2007 Job #: PR-06-039	Notes: - Samples M19-16 (a-c) were collected here. - All ACM is in good condition.	FS #: G006 FS Area: Room 110A Locker room Inspector: BM & RT
---	---	---

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	16	12" x 12" FT tan	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	n/a	FG PI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	15	MJC FI	Steam	Y	Y	10% Chrysotile	6 units	X	--	--	--	X	--	O & M	G-1	--
	15	MJC FI	Conden	Y	Y	10% Chrysotile	3 units	X	--	--	--	X	--	O & M	G-1	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 15, 2007 Job #: PR-06-039	Notes: - All ACM in good condition.	FS #: G007 FS Area: Loading dock area Room 103 Inspector: BM & RT
---	---	---

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	10	MJC FI	Steam	Y	Y	10% Chrysotile	1 unit	X	--	--	X	--	--	O & M	G-1	--
	n/a	FG PI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	Conden	Y	Y	10% Chrysotile	1 unit	X	--	--	X	--	--	O & M	G-1	--
	n/a	FG PI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 15, 2007 Job #: PR-06-039	Notes: - All ACM is in good condition.	FS #: G008 FS Area: Room 105 Loading dock area Inspector: BM & RT
---	--	---

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	08	Aircell PI	Steam	Y	Y	20% Chrysotile	4 LM	X	--	--	X	--	--	O & M	G-1	--
	n/a	FG with metal jacket	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	08	Aircell PI	Conden	Y	Y	20% Chrysotile	4 LM	X	--	--	X	--	--	O & M	G-1	--
	n/a	FG with metal jacket	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 15 & March 23, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes: Sheet 1 of 2</p> <ul style="list-style-type: none"> - On the DCW system one encapsulation of 0.2 metres of damaged aircell is required. - On the DCW system one encapsulation of damaged elbow is required - On the condensate system one encapsulation of 0.2 metres of damaged aircell is required. - On condensate system one encapsulation of damaged elbow is required. 	<p>FS #: G009 (sheet 1 of 2)</p> <p>FS Area: Rooms 116, 117 & 102</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other																
	19	MJC FI	Chiller	N	--	--	--	--	--	--	--	--	--	Non-ACM MJC	--	--
	n/a	FG PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	DCW	Y	Y	10% Chrysotile	21 units	X	--	--	X	--	--	O & M	G-1	--
	20	Sweat wrap (with white paper layer) PI	DCW	Y	Y	15% Chrysotile	15 LM	X	--	--	X	--	--	O & M	G-1	--
	21	Sweat wrap PI	DCW	N	--	--	--	--	--	--	--	--	--	Non-ACM type	--	--
	08	Aircell PI	DCW	Y	Y	20% Chrysotile	15 LM	X	--	--	X	--	--	O & M	G-1	--
	08	Aircell PI	DCW	Y	Y	20% Chrysotile	0.2 LM	--	--	X	X	--	--	1 encapsulation	G-2	18
	10	MJC FI	DCW	Y	Y	10% Chrysotile	1 unit	--	X	--	X	--	--	1 encapsulation	G-2	19
	10	MJC FI	Conden	Y	Y	10% Chrysotile	6 units	X	--	--	X	--	--	O & M	G-1	--
	08	Aircell PI	Conden	Y	Y	20% Chrysotile	6 LM	X	--	--	X	--	--	O & M	G-1	--
	08	Aircell PI	Conden	Y	Y	20% Chrysotile	0.2 LM	--	--	X	X	--	--	1 encapsulation	G-2	16
	10	MJC FI	Conden	Y	Y	10% Chrysotile	1 unit	--	X	--	X	--	--	1 encapsulation	G-2	17

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 15 & March 23, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes: Sheet 2 of 2</p> <ul style="list-style-type: none"> - On the steam system one encapsulation of damaged elbow is required. - Samples M19-19 (b &c), M19-21 (a-c) and M19-20 were collected here. 	<p>FS #: G009 (sheet 2 of 2)</p> <p>FS Area: Rooms 116, 117 & 102</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Other	10	MJC FI	Steam	Y	Y	10% Chrysotile	11 units	X	--	--	X	--	--	O & M	G-1	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	1 unit	--	X	--	X	--	--	1 encapsulation	G-2	15
	08	Aircell PI	DHW	Y	Y	20% Chrysotile	38 LM	X	--	--	X	--	--	O & M	G-1	--
	10	MJC FI	DHW	Y	Y	10% Chrysotile	10 units	X	--	--	X	--	--	O & M	G-1	--

Criteria for Access to an area containing ACM:
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C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 15, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <ul style="list-style-type: none"> - All systems have been re-insulated with non-acm insulation. - No ACM was observed. - Sample M19-19a was collected here. 	<p>FS #: G010</p> <p>FS Area: Mechanical room, room 204 and stairwell I</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG insulation	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	n/a	FG PI & FI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	DHW	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	19	MJC FI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--
	19	MJC FI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

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 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 11, 2007 Job #: PR-06-039	Notes: - This was an early 1980's addition. - Area includes rooms: 266, 266A, 267, 268, 269, 270, 271, 271A, 273, 274 & stairwell K. - No ACM was observed. - Samples M19-6 (a-c), M19-5 (a-c) and M19-7 (a-c) were collected here	FS #: 1001 FS Area: First floor addition, cubicle office area Inspector: BM
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	07	12" x 12" FT beige with red	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Fabric/metal partition panel	Cubicle	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	05	2' x 4' CT strata	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	n/a	Fibreglass	HWT	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	n/a	FG DI	HVAC	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI	HVAC	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
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C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

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 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 16, 2007 Job #: PR-06-039	Notes: - The condensate system has damaged aircell pipe insulation of 0.2 LM that requires encapsulation.	FS #: 1002 FS Area: Rooms 210, 211 storage Inspector: BM, RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	20	Sweat wrap (with white paper layer) PI	DCW	Y	Y	15% Chrysotile	4 LM	X	--	--	--	X	--	O & M	1-1	--
Above Ceil.	10	MJC FI	Steam	Y	Y	10% Chrysotile	8 units	X	--	--	--	X	--	O & M	1-1	--
	n/a	FG PI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	Conden	Y	Y	10% Chrysotile	6 units	X	--	--	--	X	--	O & M	1-1	--
	n/a	FG PI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--
	08	Aircell PI	Conden	Y	Y	20% Chrysotile	5 LM	--	X	--	--	X	--	O & M	1-1	--
	08	Aircell PI	Conden	Y	Y	20% Chrysotile	0.2 LM	--	X	--	--	X	--	1 encapsulation	1-2	20

Criteria for Access to an area containing ACM:
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C: Areas of the building behind walls or ceiling system

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F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
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 DI: Duct Insulation



Building: M-19 Date: January 17, 2007 Job #: PR-06-039	Notes: No access was available to this room during the survey.	FS #: 1005 FS Area: Room 207 Inspector: BM, RT
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Building Materials				ACM Assessment									Report Reference			
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor																
Walls																
Ceil.																
Other																
Above Ceil.																

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 17, 2007 Job #: PR-06-039	Notes: - No access under carpet. It was reported that the floor tiles were removed 3 years ago. - All ACM is in good condition.	FS #: 1007 FS Area: OHSA area, rooms: 220, 221, 222,224 Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT (4" square pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	n/a	FG batting	On CT	N	--	--	--	--	--	--	--	--	--	Bulk insulation	--	--
	n/a	FG PI & FI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG DI	Duct	N	--	--	--	--	--	--	--	--	--	--	--	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	59 LM	X	--	--	--	--	X	O & M	1-1	--
	31	Adhesive backing	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	HWH	Y	Y	10% Chrysotile	8 units	X	--	--	--	--	X	O & M	1-1	--
	12	Parging FI	Chiller	Y	Y	10 % Chrysotile	4 units	X	--	--	--	--	X	O & M	1-1	--
	n/a	Concrete	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 17, 2007 Job #: PR-06-039	Notes: - All ACM in good condition.	FS #: 1008 FS Area: Rooms: 228, 231, 231B, 232 Security Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	14	12" x 12" FT off-white	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	17	Plaster	Wall	N												
Ceil.	n/a	2' x 4' CT (4" square pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	08	Aircell PI	HWH	Y	Y	20% Chrysotile	6 LM	X	--	--	--	--	X	O & M	1-1	--
	10	MJC FI	HWH	Y	Y	10 % Chrysotile	3 units	X	--	--	--	--	X	O & M	1-1	--
	12	Parging on FI	Chiller	Y	Y	10% Chrysotile	8 units	X	--	--	--	--	X	O & M	1-1	--

Criteria for Access to an area containing ACM:
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Criteria for Condition of an ACM:
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MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 18, 2007 Job #: PR-06-039	Notes: - No access under carpet. It was reported that the floor tiles were removed 3 years ago during the installation of the carpet. - Some of the ceiling tiles have pink fibreglass insulation batting on lying on them. - All ACM's were observed in good condition.	FS #: 1009 FS Area: Realty office area; 230, 236, 237, 238 Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Partition	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	17	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT (4" square)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	n/a	FG PI & FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG DI	Duct	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG batting	Ceiling	N	--	--	--	--	--	--	--	--	--	Bulk insulation	--	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	84 LM	X	--	--	--	--	X	O & M	1-1	--
	10	MJC FI	HWH	Y	Y	10 % Chrysotile	14 units	X	--	--	--	--	X	O & M	1-1	--
	n/a	Styrofoam PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Parging FI	Chiller	Y	Y	10 % Chrysotile	16 units	X	--	--	--	--	X	O & M	1-1	--
	31	Adhesive backing	Deck	N	--	--	--	--	--	--	--	--	--	From previous CT	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
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<p>Building: M-19</p> <p>Date: January 18, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <p>- ACM's were observed above the ceiling tiles. They are in good condition.</p>	<p>FS #: 1010</p> <p>FS Area: 1st floor corridor and Stairwells 'A' & 'H'</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	14	12" x 12" FT off-white with grey	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	17	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT (4" square pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	08	Aircell PI	HWH	Y	Y	20% Chrysotile	20 LM	X	--	--	--	--	X	O & M	1-1	--
	10	MJC FI	HWH	N	Y	10% Chrysotile	12 units	X	--	--	--	--	X	O & M	1-1	--
	n/a	FG PI	HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Styrofoam	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Parging FI	Chiller	Y	Y	10% Chrysotile	6 units	X	--	--	--	--	X	O & M	1-1	--
	31	Adhesive backing	Deck	N	--	--	--	--	--	--	--	--	--	From previous CT	--	--
	n/a	Concrete deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
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MJC: Mud Joint Compound
 PI: Pipe Insulation
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 DI: Duct Insulation



Building: M-19 Date: January 18, 2007 Job #: PR-06-039	Notes: - All ACM's are in good condition. - Samples M19-32 (a-c) were collected here. - Most ACM's are below the ceiling in the room space, but out of arms reach.	FS #: 1011 FS Area: Room 203 lunch room Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	12" x 12" FT off-white with grey	Floor	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Fabric panel	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	17	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT (4" square pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	32	12" x 12" CT (lg. + sm. Dot pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	10	MJC FI	Chiller	Y	Y	10% Chrysotile	14 units	X	--	--	--	--	X	O & M	1-1	--
	n/a	FG PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	2 LM	X	--	--	--	--	X	O & M	1-1	--
	10	MJC FI	HWH	Y	Y	10% Chrysotile	10 units	X	--	--	--	--	X	O & M	1-1	--
	n/a	FG PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	n/a	FG PI	All	N	--	--	--	--	--	--	--	--	--	Re-insulated areas	--	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	23 LM	X	--	--	X	--	--	O & M	1-1	--
	10	MJC FI	HWH	Y	Y	10% Chrysotile	5 units	X	--	--	X	--	--	O & M	1-1	--
	10	MJC FI	Chiller	Y	Y	10% Chrysotile	4 units	X	--	--	X	--	--	O & M	1-1	--

Criteria for Access to an area containing ACM:

- A: All building occupants may have access to this area
- B: Restricted to building staff only
- C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:

- G: ACM is in GOOD condition; No damage
- F: ACM is in FAIR condition; Less than 2% damage
- P: ACM is in POOR condition; Greater than 2% damage

- MJC: Mud Joint Compound
- PI: Pipe Insulation
- FI: Fitting Insulation
- FG: Fibreglass
- DI: Duct Insulation



Building: M-19 Date: January 18, 2007 Job #: PR-06-039	Notes: - Metal casing on chiller system located below the ceiling. - All ACM's were observed in good condition.	FS #: 1012 FS Area: Room 227 Communications closet Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	30	9" x 9" FT red	Floor	Y	N	Suspect ACM	0.5 m ²	X	--	--	X	--	--	O & M	1-1	--
	16	12" x 12" FT beige	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	30	9" x 9" FT dark brown	Floor	Y	N	Suspect ACM	0.5 m ²	X	--	--	X	--	--	O & M	1-1	--
Walls	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Partitions	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceiling	17	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	n/a	Styrofoam PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Parging FI	Chiller	Y	Y	10% Chrysotile	6 units	X	--	--	--	--	X	O & M	1-1	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	2 LM	X	--	--	--	--	X	O & M	1-1	--
	10	MJC FI	HWH	Y	Y	10% Chrysotile	1 unit	X	--	--	--	--	X	O & M	1-1	--
Other	n/a	Styrofoam PI & FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
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MJC: Mud Joint Compound
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<p>Building: M-19</p> <p>Date: January 18, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <ul style="list-style-type: none"> - HWH system: requires the removal of 0.1 metres of severely damaged aircell pipe insulation and two encapsulations of aircell pipe insulation ends. - Suspect ACM on the HWH system above plaster ceiling at entrance of room 205, could not access area above solid ceiling. 	<p>FS #: 1014</p> <p>FS Area: Room 205 men's WC and locker room</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	14	12" x 12" FT off-white with grey	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT (4"square pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	17	Plaster	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	12	Parging FI	Chiller	Y	Y	10% Chrysotile	2 units	X	--	--	--	--	X	O & M	1-1	--
	n/a	FG DI	Duct	N	--	--	--	--	--	--	--	--	--	--	--	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	3 LM	X	--	--	--	--	X	O & M	1-1	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	0.1 LM	--	--	X	--	--	X	See notes	1-2	21
	n/a	Styrofoam PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
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G: ACM is in GOOD condition; No damage
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Building: M-19 Date: January 18, 2007 Job #: PR-06-039	Notes: - Damage on aircell PI on HWH system requires 1 encapsulation of 0.1 metres. - Removal of 2 damaged chiller system elbows is required.	FS #: 1015 FS Area: Room 206 Woman's WC Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	14	12" x 12" FT off-white with grey	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	6" x 6" ceramic tile	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
		Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT (4"square pattern)	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	09	Sweat wrap (with tar paper layer) PI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	DCW	Y	Y	10% Chrysotile	9 units	X	--	--	--	--	X	O & M	1-1	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	23 LM	X	--	--	--	--	X	O & M	1-1	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	0.1 LM	--	X	--	--	--	X	1 encapsulation	1-2	23
	23	Terracotta with mortar	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Styrofoam PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	12	Parging FI	Chiller	Y	Y	10% Chrysotile	4 units	X	--	--	--	--	X	O & M	1-1	--
	12	Parging FI	Chiller	Y	Y	10% Chrysotile	2 units	--	--	X	--	--	X	2 removals	1-2	22
	10	MJC FI	HWH	Y	Y	10% Chrysotile	8 units	X	--	--	--	--	X	O & M	1-1	--

Criteria for Access to an area containing ACM:

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Criteria for Condition of an ACM:

- G: ACM is in GOOD condition; No damage
- F: ACM is in FAIR condition; Less than 2% damage
- P: ACM is in POOR condition; Greater than 2% damage

- MJC: Mud Joint Compound
- PI: Pipe Insulation
- FI: Fitting Insulation
- FG: Fibreglass
- DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 11, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <ul style="list-style-type: none"> - No floor tile present under the carpet. - Samples M19-01 (a-c) and M19-02 (a-c) were collected here. - No ACM was observed in the area. 	<p>FS #: 2001</p> <p>FS Area: Second floor (80's) addition; first floor open office area: (rms 352, 353, 355, 356, 360, 365 and 340)</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	02	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Metal partition with fabric	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	01	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	n/a	FG DI	HVAC	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI	HVAC	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	Drywall with drywall compound	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Metal decking	Roof	N	--	--	--	--	--	--	--	--	--	--	--	--

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 DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 16, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <ul style="list-style-type: none"> - The majority of ACM pipe insulation is located near the decking which is only reachable by mechanical lift. All determinations of ACM were made from the ground. - High density light fixtures (19 units) are suspect mercury containing. - Encapsulate 1 condensate elbow that is moderately damaged. - Encapsulate 2 steam line elbows that are moderately damaged. - Sample M19-L9 was collected here. 	<p>FS #: 2002</p> <p>FS Area: Room 329 Machine shop</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment									Report Reference			
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	25	Old exterior finish	Wall	N	--	--	--	--	--	--	--	--	Previous exterior wall	--	--	--
	18	Transite wall panel	Wall	Y	N	12% Amosite	80 m ²	X	--	--	X	--	O & M	2-1	--	--
Ceil.	n/a	Metal	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
	27	ACM cement deck	Deck	Y	N	20% Chrysotile	564 m ²	X	--	--	X	--	O & M	2-1	--	--
Other	10	MJC FI	Conden	Y	Y	10% Chrysotile	1 units	--	--	X	X	--	1 encapsulation	2-2	24	--
	10	MJC FI	Conden	Y	Y	10% Chrysotile	18 units	X	--	--	X	--	O & M	2-1	--	--
	n/a	FG PI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	2 units	--	--	X	X	--	2 encapsulations	2-2	25, 27	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	27 units	X	--	--	X	--	O & M	2-1	--	--
	10	MJC FI	DCW	Y	Y	10% Chrysotile	4 units	X	--	--	X	--	O & M	2-1	--	--
	20	Sweat wrap (with white paper layer) PI	DCW	Y	Y	15% Chrysotile	18 LM	X	--	--	X	--	O & M	2-1	--	--
	19	MJC FI	Chiller	N	--	--	--	--	--	--	--	--	Non-acm type	--	--	--
	n/a	FG PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--

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PI: Pipe Insulation

FI: Fitting Insulation

FG: Fibreglass

DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 16, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <ul style="list-style-type: none"> - Some steam lines and elbows are re-insulated with fibreglass. - ACM transite wall panel used on north and east walls. - Sample of green paint (L10) collected here. - 1 encapsulation of damaged MJC FI elbow on the DCW required. 	<p>FS #: 2003</p> <p>FS Area: Room 330 Welding room</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Metal	Floor	--	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	--	--	--	--	--	--	--	--	--	--	--	--	--
	18	Transite wall panel	Wall	Y	N	12% Amosite	180 m ²	X	--	--	--	X		O & M	2-1	--
Ceil.	n/a	Concrete	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other	20	Sweat wrap (with white paper layer) PI	DCW	Y	Y	15% Chrysotile	10 LM	X	--	--	--	X	--	O & M	2-1	--
	10	MJC FI	DCW	Y	Y	10% Chrysotile	5 units	X	--	--	--	X	--	O & M	2-1	--
	10	MJC FI	DCW	Y	Y	10% Chrysotile	1 unit	--	X	--	--	X	--	1 encapsulation	2-2	26
	10	MJC FI	Conden	Y	Y	10% Chrysotile	4 units	X	--	--	--	X	--	O & M	2-1	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	7 units	X	--	--	--	X	--	O & M	2-1	--
Above Ceil.	27	ACM cement deck	Deck	Y	N	20% Chrysotile	72 m ²	X	--	--	--	--	X	O & M	2-1	--

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Building: M-19 Date: January 16, 2007 Job #: PR-06-039	Notes: - This area is part of an addition from the 1980's. - North wall has the old exterior finish. - Old glass panels on north wall may contain lead. - Samples M19-25 (a-c) were collected here. - No ACM was observed in the area.	FS #: 2004 FS Area: Rooms 332 + 335 Tool crib Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete block	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	25	Exterior finish	Wall	N	--	--	--	--	--	--	--	--	--	Old exterior wall	--	--
Ceil.	n/a	Metal deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.		n/a														

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Building: M-19	Notes: - There is 1 encapsulation required on MJC FI of the steam system.	FS #: 2006
Date: January 16, 2007		FS Area: Rooms 323 & 327
Job #: PR-06-039		Inspector: BM & RT

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Wood	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	18	Transite wall panel	Wall	Y	N	12% Amosite	105 m ²	X	--	--	--	X	---	O & M	2-1	--
Ceil.	27	ACM cement deck	Deck	Y	N	20% Chrysotile	163 m ²	X	--	--	--	X	--	O & M	2-1	--
Other	08	Aircell PI	Cond	Y	Y	20% Chrysotile	6 LM	X	--	--	--	X	--	O & M	2-1	--
	n/a	FG PI	Cond	--	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	DCW	Y	Y	10% Chrysotile	3 units	X	--	--	--	X	--	O & M	2-1	--
	20	Sweat wrap (with white paper layer) PI	DCW	Y	Y	15% Chrysotile	14 LM	X	--	--	--	X	--	O & M	2-1	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	8 units	X	--	--	--	X	--	O & M	2-1	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	1 unit	--	X	--	--	X	--	1 encapsulation	2-2	28
	08	Aircell PI	Steam	Y	Y	20% Chrysotile	30 LM	X	--	--	--	X	--	O & M	2-1	--

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 FI: Fitting Insulation
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Building: M-19 Date: January 16, 2007 Job #: PR-06-039	Notes: - All ACM is in good condition.	FS #: 2007 FS Area: Rooms 301, 303, 301A Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	23	Terracotta with mortar	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	27	ACM cement deck	Deck	Y	N	20% Chrysotile	58 m ²	X	--	--	--	--	X	O & M	2-1	--

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Building: M-19	Notes: - All ACM was observed in good condition.	FS #: 2008
Date: January 16, 2007		FS Area: Rooms 326, 326A, 326B
Job #: PR-06-039		Inspector: BM & RT

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	14	12" x 12" FT off-white	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	n/a	FG PI FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	Conden	Y	Y	10% Chrysotile	6 units	X	--	--	--	--	X	O & M	2-1	---
	n/a	FG PI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	4 units	X	--	--	--	--	X	O & M	2-1	--
	27	ACM cement deck	Deck	Y	N	20% Chrysotile	45m ²	X	--	--	--	--	X	O & M	2-1	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19	Notes: - On condensate system, 1 MJC elbow is cracked and requires encapsulation.	FS #: 2009
Date: January 16, 2007		FS Area: Room 328
Job #: PR-06-039		Inspector: BM & RT

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	14	12" x 12" FT off-white	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	27	ACM cement deck	Deck	Y	N	20% Chrysotile	110 m ²	X	--	--	--	--	X	O & M	2-1	--
	n/a	FG PI	Steam	--	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI	Conden	--	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	Conden	Y	Y	10% Chrysotile	3 units	--	X	--	--	--	X	O & M	2-1	--
	10	MJC FI	Conden	Y	Y	10% Chrysotile	1 unit	--	X	--	--	--	X	1 encapsulation	2-2	29

Criteria for Access to an area containing ACM:
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Criteria for Condition of an ACM:
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F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 16, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <ul style="list-style-type: none"> - All observations were made from ground level. - 1 encapsulation of MJC fitting insulation on the condensate system is required. - 1 encapsulation of 0.1 metres of aircell pipe insulation on the steam system is required. - 3 encapsulations of MJC fitting insulation is required on the steam system. 	<p>FS #: 2010</p> <p>FS Area: Room, 328 (D,E,F) (ATCO) & Stairwell C</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Metal	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Metal/fabric partition	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	18	Transite wall panel	Wall	Y	N	12% Amosite	55 m ²	X	--	--	--	X	--	O & M	2-1	--
Ceil.	27	ACM cement deck	Deck	Y	N	20% Chrysotile	129 m ²	X	--	--	--	X	--	O & M	2-1	--
Other	08	Aircell PI	Steam	Y	Y	20% Chrysotile	34 LM	X	--	--	--	X	--	O & M	2-1	--
	08	Aircell PI	Steam	Y	Y	20% Chrysotile	0.1 LM	--	X	--	--	X	--	1 encapsulation	2-2	32
	n/a	FG PI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	19 units	X	--	--	--	X	--	O & M	2-1	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	3 units	--	--	X	--	X	--	3 encapsulations	2-2	30, 31
	10	MJC FI	Con	Y	Y	10% Chrysotile	10 units	X	--	--	--	X	--	O & M	2-1	--
	10	MJC FI	Con	Y	Y	10% Chrysotile	1 units	--	X	--	--	X	--	1 encapsulation	2-2	33
	n/a	FG PI	Con	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI	Drain	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 17, 2007 Job #: PR-06-039	Notes: - All ACM is in good condition.	FS #: 2011 FS Area: Room 304 Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	27	ACM cement deck	Deck	Y	N	20% Chrysotile	18 m ²	X	--	--	--	--	X	O & M	2-1	--
	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	23	Terracotta with mortar	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 17, 2007 Job #: PR-06-039	Notes: - All ACM is in good condition.	FS #: 2013 FS Area: Front entrance and hallway Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	26	9" x 9" FT green	Floor	Y	N	2% Chrysotile	15 m ²	X	--	--	X	--	--	O & M	2-1	--
	26	9" x 9" FT white	Floor	Y	N	2% Chrysotile	15 m ²	X	--	--	X	--	--	O & M	2-1	--
	n/a	Terrazzo	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	27	ACM cement deck	Deck	Y	N	20% Chrysotile	85 m ²	X	--	--	--	--	X	O & M	2-1	--
	23	Terracotta with mortar	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
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C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
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 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 17, 2007 Job #: PR-06-039	Notes: No access above solid ceiling. It is believed that ACM cement decking is present above the ceiling in this area.	FS #: 2014 FS Area: Room 314 Men's washroom Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Terrazzo	Floor	--	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	--	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Ceramic tile	Wall	--	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Drywall	Wall	--	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Drywall	Ceiling	--	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	27	ACM cement deck	Deck	Y	N	20% Chrysotile	--	--	--	--	--	--	--	See notes	2-1	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 17, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <ul style="list-style-type: none"> - Mould on chiller pipe insulation and duct insulation above ceiling. - All mechanical insulation in this area is non-acm. - All ACM was observed in good condition. 	<p>FS #: 2015</p> <p>FS Area: Offices 315, 313, 312, (312A,B,C,D), 308 + 306</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	29	Off-white linoleum	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	30	9" x 9" Floor Tile (under carpet)	Floor	Y	N	Suspect ACM	283 m ²	X	--	--	--	--	X	O & M	2-1	--
	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Metal/fabric partition	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	n/a	FG PI & FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	27	ACM cement deck	Deck	Y	N	20% Chrysotile	290 m ²	X	--	--	--	--	X	O & M	2-1	--
	n/a	FG DI	Duct	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG batting	On CT	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Mould on PI and DI		n/a	--	--	--	--	--	--	--	--	--	See notes	2-3	M01
Other	n/a															

Criteria for Access to an area containing ACM:
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Criteria for Condition of an ACM:
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F: ACM is in FAIR condition; Less than 2% damage
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 PI: Pipe Insulation
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<p>Building: M-19</p> <p>Date: March 23, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <p>- No access was possible above the solid ceiling. It is believed that ACM cement decking is present above the ceiling in this area.</p>	<p>FS #: 2016</p> <p>FS Area: Room 317 Storage/office</p> <p>Inspector: BM, RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	26	9" x 9" FT green	Floor	Y	N	2% Chrysotile	9 m ²	X	--	--	X	--	--	O & M	2-1	--
Walls	17	Plaster	Walls	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	17	Plaster	Ceil.	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceiling	27	ACM cement deck	Deck	Y	N	20% Chrysotile	--	--	--	--	--	--	--	See notes	2-1	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: March 23, 2007 Job #: PR-06-039	Notes: - ACM was observed in good condition.	FS #: 2017 FS Area: Room 319a Office Inspector: BM, RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	n/a	FG DI	Duct	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI + FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	27	ACM cement deck	Deck	Y	N	20% Chrysotile	14 m ²	X	--	--	--	--	X	O & M	2-1	--

Criteria for Access to an area containing ACM:
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C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
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F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: March 23, 2007 Job #: PR-06-039	Notes: - ACM was observed in good condition. - Sample M19-23f was collected here.	FS #: 2018 FS Area: Room 319b Office Inspector: BM, RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	n/a	FG DI	Duct	N	--	--	--	--	--	--	--	--	--	--	--	--
	27	ACM cement deck	Deck	Y	N	20% Chrysotile	15 m ²	X	--	--	--	--	X	O & M	2-1	--
	23	Terracotta with mortar	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: March 23, 2007 Job #: PR-06-039	Notes: - ACM was observed in good condition. - Samples M19-34 (a-c) were collected here. - Sample M19-23g was collected here.	FS #: 2019 FS Area: Room 318 Files office Inspector: BM, RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	16	12" x 12" FT tan	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	17	Plaster	Walls	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Drywall	Wall													
Ceil.	n/a	2' x 4' CT	Ceil.	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
	34	2' x 4' CT horizontal divot	Ceil	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	n/a	FG DI	Duct	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI + FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	27	ACM cement deck	Deck	Y	N	20% Chrysotile	49 m ²	X	--	--	--	--	X	O & M	2-1	--
	23	Terracotta with mortar	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 17, 2007 Job #: PR-06-039	Notes: - All ACM is in good condition.	FS #: 2020 FS Area: Room 320 Women's washroom Inspector: BM & RT
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	29	Off-white linoleum	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	2' x 4' CT	Ceiling	N	--	--	--	--	--	--	--	--	--	Post 1986	--	--
Above Ceil.	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	27	ACM cement deck	Ceiling	Y	N	20% Chrysotile	24 m ²	X	--	--	--	--	X	O & M	2-1	--
	n/a	FG DI	Duct	N	--	--	--	--	--	--	--	--	--	--	--	--
	23	Terracotta with mortar	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
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 PI: Pipe Insulation
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 FG: Fibreglass
 DI: Duct Insulation



<p>Building: M-19</p> <p>Date: January 11, 2007</p> <p>Job #: PR-06-039</p>	<p>Notes:</p> <ul style="list-style-type: none"> - This stairwell was part of an early 1980's addition. - Samples M19-03 (a-e), M19-01C and M19-04 (a-c) were collected here. - No ACM was observed. 	<p>FS #: SW01</p> <p>FS Area: Stairwell J</p> <p>Inspector: BM & RT</p>
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Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	04	12" x 12" FT grey	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	03	Stucco	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
	01	2' x 4' CT scatter divot pattern	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Above Ceil.	n/a	Metal deck	Deck	N	--	--	--	--	--	--	--	--	--	--	--	--
	02	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 15, 2007 Job #: PR-06-039	Notes: - No access above the solid ceiling. - HWH system: damage of aircell pipe insulation (0.5 LM) that requires encapsulation.	FS #: SW02 FS Area: Stairwell D & room 101 Inspector: BM & RT
---	--	--

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	14	12" x 12" FT off-white with grey	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	02	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	02	Drywall	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	10	MJC FI	Conden	Y	Y	10% Chrysotile	6 units	X	--	--	X	--	--	O & M	G-1	---
	08	Aircell PI	Conden	Y	Y	20% Chrysotile	2 LM	X	--	--	X	--	--	O & M	G-1	--
	10	MJC FI	Steam	Y	Y	10% Chrysotile	7 units	X	--	--	X	--	--	O & M	G-1	--
	08	Aircell PI	Steam	Y	Y	20% Chrysotile	2 LM	--	--	X	X	--	--	O & M	G-1	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	2 LM	--	--	X	X	--	--	O & M	1-1	--
	08	Aircell PI	HWH	Y	Y	20% Chrysotile	0.5 LM	--	--	X	X	--	--	1 encapsulation	1-2	34
	10	MJC FI	HWH	Y	Y	10% Chrysotile	1 unit	--	--	X	X	--	--	O & M	1-1	--
Above Ceil.		n/a														

Criteria for Access to an area containing ACM:

- A: All building occupants may have access to this area
- B: Restricted to building staff only
- C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:

- G: ACM is in GOOD condition; No damage
- F: ACM is in FAIR condition; Less than 2% damage
- P: ACM is in POOR condition; Greater than 2% damage

- MJC: Mud Joint Compound
- PI: Pipe Insulation
- FI: Fitting Insulation
- FG: Fibreglass
- DI: Duct Insulation



Building: M-19 Date: January 16, 2007 Job #: PR-06-039	Notes: - All ACM is in good condition. - Sample M19-17G was collected here.	FS #: SW03 FS Area: Stairwell E Inspector: BM & RT
---	--	---

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Metal	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	17	Plaster	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	n/a	Concrete	Ceiling	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	n/a	FG PI	HWH	N	--	--	--	--	--	--	--	--	--	--	--	--
	10	MJC FI	HWH	Y	Y	10% Chrysotile	3 units	X	--	--	X	--	--	O & M	1-1	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: March 23, 2007 Job #: PR-06-039	Notes: - All ACM is in good condition. - No access above ceiling tiles, they are attached with adhesive. - Samples M19-13 (a-c) and M19-33 (a-c) were collected here.	FS #: M001 FS Area: Fitness room and stairwell B Inspector: BM & RT
---	---	--

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Friable Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Carpet	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	18	Transite panel	Wall	Y	N	12% Chrysotile	18 m ²	X	--	--	X	--	--	O & M	G-1	--
	n/a	Drywall	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	33	12" x 12" CT with small holes	Ceil.	N	--	--	--	--	--	--	--	--	--	--	--	--
	13	12" x 12" CT	Ceil.	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	Concrete	Ceil.	N	--	--	--	--	--	--	--	--	--	--	--	--
Other	12	Parging FI	Chiller	Y	Y	10% Chrysotile	2 units	X	--	--	X	--	--	O & M	G-1	--
	n/a	Styrofoam PI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG FI	Chiller	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation



Building: M-19 Date: January 17, 2007 Job #: PR-06-039	Notes: - All ACM is in good condition.	FS #: M003 FS Area: Mezzanine storage, room 324 & stairwell F Inspector: BM & RT
---	--	---

Building Materials				ACM Assessment										Report Reference		
Location	Homg. Mat. #	Material Description	System	ACM Y/N	Fri-able Y/N	ACM Type	Qty.	Condition			Access			Response / Comments	Dwg. #	Photo #
								G	F	P	A	B	C			
Floor	n/a	Concrete	Floor	N	--	--	--	--	--	--	--	--	--	--	--	--
Walls	n/a	Concrete	Wall	N	--	--	--	--	--	--	--	--	--	--	--	--
Ceil.	27	ACM cement deck	Deck	Y	N	20% Chrysotile	68 m ²	X	--	--	--	--	X	O & M	2-1	--
Other	20	Sweat wrap (with white paper layer) PI	DCW	Y	Y	15% Chrysotile	6 LM	X	--	--	--	--	X	O & M	2-1	--
	n/a	FG FI	DCW	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	Conden	N	--	--	--	--	--	--	--	--	--	--	--	--
	n/a	FG PI & FI	Steam	N	--	--	--	--	--	--	--	--	--	--	--	--

Criteria for Access to an area containing ACM:
A: All building occupants may have access to this area
B: Restricted to building staff only
C: Areas of the building behind walls or ceiling system

Criteria for Condition of an ACM:
G: ACM is in GOOD condition; No damage
F: ACM is in FAIR condition; Less than 2% damage
P: ACM is in POOR condition; Greater than 2% damage

MJC: Mud Joint Compound
 PI: Pipe Insulation
 FI: Fitting Insulation
 FG: Fibreglass
 DI: Duct Insulation

Functional Space Forms

The functional space form provides a general guide of information collected in each room or area of the facility and is considerate of but is not limited to the following:

- (a) **Building Materials** - Each building material is given a description as to the location, homogenous material number, location and system;
- (b) **ACM Assessment** - Each building material that is found to contain ACM is assessed as to friability, ACM type, quantity, condition, access and appropriate response;
- (c) **Report Reference** - Report references to building materials with respect to drawings and photographs numbers is made available for convenience. Drawings and photographs are located in the Appendices section of this report.

Each functional space is assigned a four digit number beginning with 1001 for the first floor, 2001 for the second floor, 3001 for the third floor, and so on. Functional spaces are determined on a room-to-room or area-to-area basis. Also, included on each form is: building, date, Oakhill job number, functional space area name, inspector and notes. In the notes section important additional comments are made regarding ACM found in this area, samples collected and any areas within this functional space that were considered inaccessible at the time of inspection.

The functional space form is a useful tool for the collection of survey data and communication of such data for your record keeping purposes.

Criteria for Assessing Condition of ACM

The following criteria were used for evaluating the condition of ACM:

GOOD (G): The building material has no evidence of exposed ACM and exhibits no signs of damage or deterioration

FAIR (F): The building material has minor damage (less than 2%) and the potential for an airborne release of asbestos is low to moderate.

POOR (P): The building material has moderate to major damage (greater than 2%) and the potential for an airborne release of asbestos is moderate to moderate to high.

The evaluation of the potential for an airborne release of asbestos from an ACM is also considerate of fibre generating mechanisms. This involves any form of action that can cause deterioration of the ACM resulting in the generation of airborne asbestos fibres. Typical fibre generating mechanisms may include: water damage, grinding, vibration, air movement, etc. This determination is made based on the best professional judgement of the experienced inspector.

Criteria for Assessing Access to ACM

The accessibility of ACM identified was rated as:

Access A: All building occupants may have access to this area.

Access B: Restricted to building staff only.

Access C: Areas of the building located behind walls or ceiling systems.

Response

Each ACM material, after all considerations, is given an appropriate response. The following is an explanation of each response that may be given:

Removal: For extensively damaged materials that cannot sustain encapsulation or materials that pose a significant potential for an airborne release and exposure to building occupants (i.e. debris). Requires immediate attention and encapsulation is not an option.

Encapsulation: Encapsulation involves the repair of damaged materials (i.e. canvas and lagging of damaged ACM pipe insulation). Materials that require encapsulation pose a potential risk of an airborne release ranging from low to high but restoration of the ACM is still a viable option. Encapsulation is not applicable if the material is severely deteriorated.

O & M Operations & Maintenance: These materials were found in good condition and should be periodically inspected.

Hebb, Stephen

From: Andrew Cooney <acooney@dstgroup.com>
Sent: Tuesday, November 14, 2017 11:09 AM
To: Hebb, Stephen
Cc: Nicolas Strang
Subject: NRC M19
Attachments: M19 Sample Locations.pdf; M19 Laboratory Results.pdf

Good Morning Stephen,

DST was onsite at the NRC M-19 Building on November 10, 2017 to collect a total of twenty-four (24) bulk samples of building materials for analysis of asbestos content. Samples were submitted to Paracel Laboratories for analysis.

A summary of the laboratory analysis and associated recommendations are as follows:

Sample ID	Location	Material	Result
31268-M19-01A-C	Corridor Outside of Room 318	Plaster- White and Grey Layers	None Detected
31268-M19-02A-C	Room 318 Ceiling	2'X4' Ceiling Tiles- Deep Fissures	None Detected
31268-M19-03A-C	Room 318 Ceiling	2'X4' Ceiling Tiles- Shallow Fissures	None Detected
31268-M19-04A-C	Room 318- Interior Wall	Plaster- White and Grey Layers	None Detected
31268-M19-05A-C	Room 328C- Ceiling	2'X4' Ceiling Tiles- Off White with Random Fissures	None Detected
31268-M19-06A-C	Room 328C- Ceiling	2'X4' Ceiling Tiles- White with Random Fissures	None Detected
31268-M19-07A-C	Room 328C- Bulkhead	Drywall Joint Compound	None Detected
31268-M19-08A-C	Room 332- Partition Wall Between Room 332 and 325	Drywall Joint Compound	1% Chrysotile Asbestos

*Transite panels were also identified by the client using the existing building DSR.

Sample locations can be found on the attached M19 Sample Locations. Laboratory results are also attached.

Recommendations:

The disturbance of asbestos-containing materials on construction and demolition projects in the province of Ontario is governed by *O. Reg. 278/05, Asbestos on Construction Projects and in Buildings and Repair Operations* enabled under the *Occupational Health and Safety Act (R.S.O. 1990, Chapter O.1)*, as amended. This regulation classifies all asbestos disturbances as either Low Risk (Type 1), Moderate Risk (Type 2), or High Risk (Type 3), each of which has defined precautionary measures. All asbestos materials are subject to specific handling and disposal precautions, and must be removed prior to demolition or renovation. The Ontario Ministry of Labour (MOL) must be notified of any project involving removal of more than a minor amount (e.g. typically one square metre) of friable asbestos material.

The removal of less than one square metre of drywall in which joint-filling compounds are asbestos-containing can be performed following Type 1 asbestos precautionary measures, as applicable as per O.Reg 278/05, as amended. The removal of one square metre or more of drywall in which joint-filling compounds are asbestos-containing must be performed following Type 2 asbestos removal procedures, as a minimum.

The removal or disturbance of non-friable ACMs such as transite panels can be completed using Type 1 asbestos precautionary measures, provided the material is wetted and only non-powered hand-held tools are used. If these conditions cannot be met, then more stringent (Type 2 or Type 3) procedures are required.

For federal projects, abatement of asbestos-containing materials must comply with the requirements of the Public Services and Procurement Canada *Asbestos Management Directive* as well as the *Regulations Amending Certain Regulations Made Under the Canada Labour Code*. These documents include requirements for air monitoring during Type 2 and 3 asbestos abatement operations.

The time weight average exposure limit (TWael) for airborne asbestos is prescribed by Ontario Regulation 490/09 *Designated Substances*, as amended. Work procedures and personal protective equipment must be used to ensure that workers are not exposed to airborne asbestos levels that exceed this TWael.

The following recommendations apply to ACMs:

1. In general, materials must be maintained in good condition;
2. The condition of material(s) identified in this report must be inspected at least annually, and this record must be updated accordingly;
3. Appropriate work procedures and precautionary measures must be used, as outlined in O. Reg. 278/05, as amended, when performing work that may disturb ACMs or suspected ACMs, including prior to building demolition;
4. If ACMs or suspected ACMs become damaged and worker exposure to the material is likely to occur, the damaged material must be repaired or removed following work procedures outlined in O. Reg. 278/05, as amended; and
5. Disposal of asbestos waste is controlled by the Ontario Environmental Protection Act, R.R.O., 1990, Regulation 347, *General – Waste Management*, as amended. This regulation requires that asbestos waste be sealed in double containers resistant to puncture and tears, and appropriately labelled. The waste must be disposed at a licensed waste disposal site. Proper notification must be issued to the site representative prior to transportation of waste. The transport of the waste to the disposal site is controlled by the federal *Transportation of Dangerous Goods Act*, 1992 (TDGA).

Materials that have not been analyzed, but are visibly similar to other materials identified as asbestos-containing, must be considered asbestos-containing unless proven otherwise by laboratory analysis.

If you have any questions or concerns please contact our office.

Thank you,

Andrew Cooney
Scientist

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Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)

203-2150 Thurston Dr.
Ottawa, ON K1G5T9
Attn: Andrew Cooney

Client PO: NRC - M19 ACM Sampling
Project: GV OT 031268
Custody:

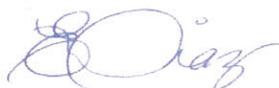
Report Date: 13-Nov-2017
Order Date: 10-Nov-2017

Order #: 1746020

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
1746020-01	31268-M19-01A (Grey Plaster)
1746020-02	31268-M19-01B (Grey Plaster)
1746020-03	31268-M19-01C (Grey Plaster)
1746020-04	31268-M19-01A (White Plaster)
1746020-05	31268-M19-01B (White Plaster)
1746020-06	31268-M19-01C (White Plaster)
1746020-07	31268-M19-02A
1746020-08	31268-M19-02B
1746020-09	31268-M19-02C
1746020-10	31268-M19-03A
1746020-11	31268-M19-03B
1746020-12	31268-M19-03C
1746020-13	31268-M19-04A (White Plaster)
1746020-14	31268-M19-04B (White Plaster)
1746020-15	31268-M19-04C (White Plaster)
1746020-16	31268-M19-04A (Grey Plaster)
1746020-17	31268-M19-04B (Grey Plaster)
1746020-18	31268-M19-04C (Grey Plaster)
1746020-19	31268-M19-05A
1746020-20	31268-M19-05B
1746020-21	31268-M19-05C
1746020-22	31268-M19-06A
1746020-23	31268-M19-06B
1746020-24	31268-M19-06C
1746020-25	31268-M19-07A
1746020-26	31268-M19-07B

Approved By:



Emma Diaz

Senior Analyst

Any use of these results implies your agreement that our total liability in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Client: DST Consulting Engineers Inc. (Ottawa)

Report Date: 13-Nov-2017

Order Date: 10-Nov-2017

Client PO: NRC - M19 ACM Sampling

Project Description: GV OT 031268

1746020-27	31268-M19-07C
1746020-31	31268-M19-08A (Drywall Joint Compound)
1746020-32	31268-M19-08B (Drywall Joint Compound)
1746020-33	31268-M19-08C (Drywall Joint Compound)

Certificate of Analysis
 Client: DST Consulting Engineers Inc. (Ottawa)
 Client PO: NRC - M19 ACM Sampling

Report Date: 13-Nov-2017
 Order Date: 10-Nov-2017
 Project Description: GV OT 031268

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Parcel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1746020-01	10-Nov-17	sample homogenized	Grey	Plaster	No	Client ID: 31268-M19-01A (Grey Plaster) Non-Fibers	100
1746020-02	10-Nov-17	sample homogenized	Grey	Plaster	No	Client ID: 31268-M19-01B (Grey Plaster) Non-Fibers	100
1746020-03	10-Nov-17	sample homogenized	Grey	Plaster	No	Client ID: 31268-M19-01C (Grey Plaster) Non-Fibers	100
1746020-04	10-Nov-17	sample homogenized	White	Plaster	No	Client ID: 31268-M19-01A (White Plaster) Non-Fibers	100
1746020-05	10-Nov-17	sample homogenized	White	Plaster	No	Client ID: 31268-M19-01B (White Plaster) Non-Fibers	100
1746020-06	10-Nov-17	sample homogenized	White	Plaster	No	Client ID: 31268-M19-01C (White Plaster) Non-Fibers	100
1746020-07	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-02A Cellulose MMVF Non-Fibers	40 10 50
1746020-08	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-02B Cellulose MMVF Non-Fibers	40 10 50
1746020-09	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-02C Cellulose MMVF Non-Fibers	40 10 50
1746020-10	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-03A Cellulose MMVF Non-Fibers	40 10 50
1746020-11	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-03B Cellulose MMVF Non-Fibers	40 10 50

Certificate of Analysis

Client: DST Consulting Engineers Inc. (Ottawa)

Client PO: NRC - M19 ACM Sampling

Report Date: 13-Nov-2017

Order Date: 10-Nov-2017

Project Description: GV OT 031268

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Parcel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1746020-12	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-03C Cellulose	40
						MMVF	10
						Non-Fibers	50
1746020-13	10-Nov-17	sample homogenized	White	Plaster	No	Client ID: 31268-M19-04A (White Plaster) Non-Fibers	100
1746020-14	10-Nov-17	sample homogenized	White	Plaster	No	Client ID: 31268-M19-04B (White Plaster) Non-Fibers	100
1746020-15	10-Nov-17	sample homogenized	White	Plaster	No	Client ID: 31268-M19-04C (White Plaster) Non-Fibers	100
1746020-16	10-Nov-17	sample homogenized	Grey	Plaster	No	Client ID: 31268-M19-04A (Grey Plaster) Non-Fibers	100
1746020-17	10-Nov-17	sample homogenized	Grey	Plaster	No	Client ID: 31268-M19-04B (Grey Plaster) Non-Fibers	100
1746020-18	10-Nov-17	sample homogenized	Grey	Plaster	No	Client ID: 31268-M19-04C (Grey Plaster) Non-Fibers	100
1746020-19	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-05A Cellulose	40
						MMVF	10
						Non-Fibers	50
1746020-20	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-05B Cellulose	40
						MMVF	10
						Non-Fibers	50
1746020-21	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-05C Cellulose	40
						MMVF	10
						Non-Fibers	50
1746020-22	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-06A Cellulose	40
						MMVF	20
						Non-Fibers	40

Certificate of Analysis
Client: DST Consulting Engineers Inc. (Ottawa)
Client PO: NRC - M19 ACM Sampling

Report Date: 13-Nov-2017
Order Date: 10-Nov-2017
Project Description: GV OT 031268

Asbestos, PLM Visual Estimation **MDL - 0.5%**

Parcel I.D.	Sample Date	Layers Analyzed	Colour	Description	Asbestos Detected:	Material Identification	% Content
1746020-23	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-06B Cellulose MMVF Non-Fibers	 40 20 40
1746020-24	10-Nov-17	sample homogenized	White/Grey	Ceiling Tile	No	Client ID: 31268-M19-06C Cellulose MMVF Non-Fibers	 40 20 40
1746020-25	10-Nov-17	sample homogenized	Grey	Drywall Joint Compound	No	Client ID: 31268-M19-07A Non-Fibers	 100
1746020-26	10-Nov-17	sample homogenized	Grey	Drywall Joint Compound	No	Client ID: 31268-M19-07B Non-Fibers	 100
1746020-27	10-Nov-17	sample homogenized	Grey	Drywall Joint Compound	No	Client ID: 31268-M19-07C Non-Fibers	 100
1746020-31	10-Nov-17	sample homogenized	Grey	Drywall Joint Compound	Yes	Client ID: 31268-M19-08A (Drywall Joint Compound) Chrysotile Non-Fibers	 1 99
1746020-32	10-Nov-17					Client ID: 31268-M19-08B (Drywall Joint Compound) not analyzed	
1746020-33	10-Nov-17					Client ID: 31268-M19-08C (Drywall Joint Compound) not analyzed	

* MMVF: Man Made Vitreous Fibers: Fiberglass, Mineral Wool, Rockwool, Glasswool

** Analytes in bold indicate asbestos mineral content.

Analysis Summary Table

Analysis	Method Reference/Description	Lab Location	NVLAP Lab Code *	Analysis Date
Asbestos, PLM Visual Estimation	by EPA 600/R-93/116	2 - Ottawa West Lab	200812-0	13-Nov-17

* Reference to the NVLAP term does not permit the user of this report to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Work Order Revisions / Comments

None



Parcel ID: 1746020



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9 St. Laurent Blvd.
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info@paracellabs.com

Chain of Custody
(Lab Use Only)

Page 1 of 1

Client Name: DST Consulting Engineers	Project Reference: GVOT-031268	Turnaround Time: <input type="checkbox"/> Immediate <input checked="" type="checkbox"/> 1 Day <input type="checkbox"/> 4 Hour <input type="checkbox"/> 2 Day <input type="checkbox"/> 8 Hour <input type="checkbox"/> 3 Day <input type="checkbox"/> Regular Date Required: <small>Before COB Nov 13/2017</small>
Contact Name: Andrew Cooney	Quote #: 16-117	
Address: 2150 Thurston Drive, Ottawa, ON	PO #: NRC- M19 ACM Sampling Email Address: acooney@dstgroup.com	
Telephone: 613-290-0101 / 613-748-1415	nstrang@dstgroup.com	

ASBESTOS & MOLD ANALYSIS

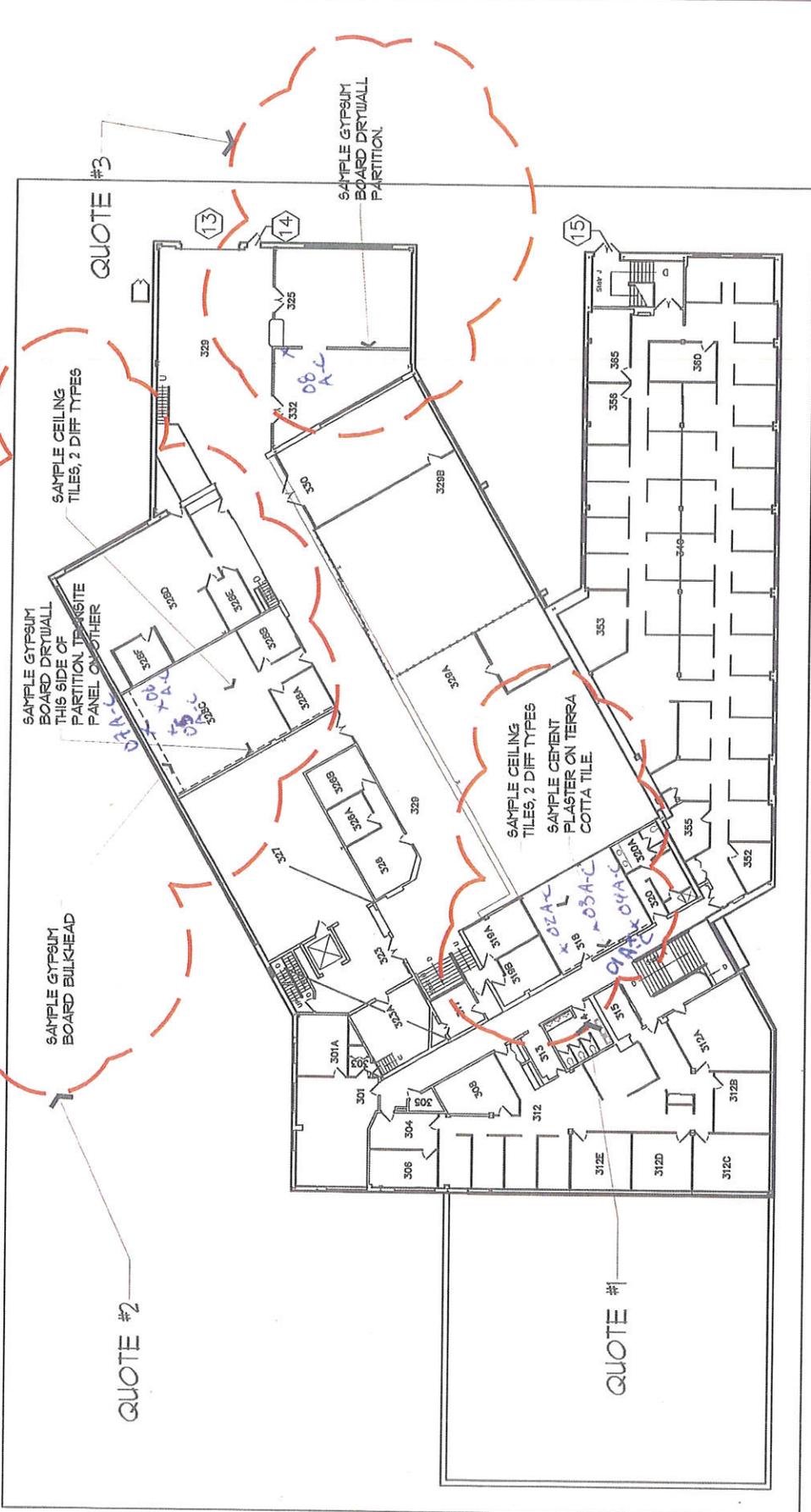
Matrix: Air Bulk Tape Lift Swab Other Regulatory Guideline: ON QC AB SK Other: _____
 Analyses: Microscopic Mold Culturable Mold Bacteria GRAM PCM Asbestos PLM Asbestos Chatfield Asbestos TEM Asbestos

Parcel Order Number: <i>1746020</i>		Asbestos - Bulk					
Sample ID	Sampling Date	Air Volume (L)	Analysis Required	Identify Distinct Building Materials to Be Analyzed <i>* see below</i>	Combine Identified Materials? <i>**see below</i>	Positive Stop?	
1	31288 M19-01A-C	11/10/2017	PLM	Analyze all layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	31289 M19-02A-C	11/10/2017	PLM	Analyze all layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	31288 M19-03A-C	11/10/2017	PLM	Analyze all layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	31288 M19-04A-C	11/10/2017	PLM	Analyze all layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	31288 M19-05A-C	11/10/2017	PLM	Analyze all layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	31288 M19-06A-C	11/10/2017	PLM	Analyze all layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	31288 M19-07A-C	11/10/2017	PLM	Analyze all layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	31288 M19-08A-C	11/10/2017	PLM	Analyze all layers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9					<input type="checkbox"/>	<input type="checkbox"/>	
10					<input type="checkbox"/>	<input type="checkbox"/>	
11					<input type="checkbox"/>	<input type="checkbox"/>	
12					<input type="checkbox"/>	<input type="checkbox"/>	

* If left blank, Paracel will analyze all materials identified during analysis ** If left blank, Paracel will analyze all materials as individual samples (at additional cost) per EPA 600/R-93/116

Comments: _____ Method of Delivery: *Walk-in*

Relinquished By (Signature): <i>[Signature]</i>	Received at Depot: <i>Parcel subject</i>	Received at Lab: <i>Karen Cull</i>	Verified By: <i>Karen Cull</i>
Relinquished By (Print): Andrew Cooney	Date/Time: <i>NOV 10/17 4:09</i>	Date/Time: <i>Nov 13/17 9:22</i>	Date/Time: <i>Nov 13/17 10:12</i>



ASPM 11x17 ARC - CNRC General Building or residential Commercial Administrative Services Temporary Enclosures or Structures Disabled and services for temporary or permanent structures or structures		project drawing sheet of sheets		project drawing sheet of sheets		project drawing sheet of sheets		project drawing sheet of sheets	
title drawing sheet of sheets		title drawing sheet of sheets		title drawing sheet of sheets		title drawing sheet of sheets		title drawing sheet of sheets	

Part 1 GENERAL

1.1 Scope of Work

- .1 Provide interior protection prior to demolition work.
- .2 Protection to be constructed in such a fashion so as to afford security, dust and weather resistance.
- .3 Barriers to be constructed continuously on the interior perimeter.

Part 2 PRODUCTS

2.1 Materials

- .1 1/2" x 4'-0" x 8'-0" wood sheathing.
- .2 3-5/8" metal studding.
- .3 3-1/2" spruce wood, construction grade studding.
- .4 6 mil. polyethylene.
- .5 Vinyl reinforced tarps.

2.2 Erection

- .1 Construct a solid barrier in all locations where window, A/C, or roof modifications are to occur.
- .2 Construct barriers full height and line with polyethylene to ensure dust and watertightness.
- .3 Have a mock-up assembly approved by the Departmental Representative prior to proceeding with the erection.

Part 3 SECONDARY PROTECTION

3.1 Dust Walls

- .1 As the work progresses and after all structural work and wall framing have been completed, remove the temporary interior protection walls and construct a 6 mill polyethylene dust wall in its place, to allow finish work to proceed.

-
- .2 Install wood sheathing in the new window openings temporarily until the new glazing units have been received.
 - .3 Inspect walls on a regular basis to ensure integrity of the assembly and to avoid dust and water infiltration to the interior of the building.
 - .4 Remove interior protections only when approved by the Departmental Representative.

Part 4 REINSTATEMENTS

4.1 Finishes

- .1 Reinststate the interior finishes affected by this work to the satisfaction of the Departmental Representative.

END OF SECTION

Part 1 GENERAL

1.1 REFERENCES

- .1 CSA International
 - .1 CSA S350-M1980(R2003), 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 If 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.
- .3 Proceed only after receipt of written instructions have been received from Departmental Representative.
- .4 Notify Departmental Representative before disrupting building access or services.

Part 2 PRODUCTS

2.1 NOT USED

- .1 Not used.

Part 3 EXECUTION

3.1 EXAMINATION

- .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 Cooperate with and coordinate all trades in marking out required locations of floor and wall penetrations necessary to accommodate installation of new services.
- .3 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

- .4 Notify and obtain approval of utility companies before starting demolition.
- .5 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.
- .6 Immediately notify Departmental Representative and utility company concerned in case of damage to any utility or service, designated to remain in place.
- .7 Immediately notify the Departmental Representative should uncharted utility or service be encountered, and await instruction in writing regarding remedial action.

3.2 PREPARATION

- .1 Protection of In-Place Conditions:
 - .1 Prevent movement, settlement, or damage to adjacent structures, utilities, and landscaping features 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.
 - .4 Provide temporary dust screens, covers, railings, supports and other protection as required.
- .2 Demolition/Removal:
 - .1 Remove parts of existing building to permit new construction.

3.3 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 is 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.

3.4 DISPOSAL

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

3.5 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 Source Quality Control

- .1 Identify lumber and plywood by grade stamp of an agency certified by Canadian Lumber Standards Administration Board and in accordance with applicable CSA standards.

1.2 PRODUCTS

1.3 Lumber Material

- .1 Except as indicated or specified otherwise lumber shall be softwood, S4S, moisture content (MC) not greater than 19% at time of installation, in accordance with following standards:
 - .2 CSA O141-91.
 - .3 NLGA Standard Grading Rules for Canadian Lumber.
 - .4 Furring, blocking, nailing strips, grounds, rough bucks:
 - .5 Use S2S or S4S material.
 - .6 Board sizes: C or D species, utility grade.
 - .7 Dimension sizes: C or D species, utility grade.
 - .8 Plywood, exterior quality, GIS to CSA O121-M1978.

1.4 Fastenings & Hardware

- .1 In accordance with Part 9 of NBC 2010 as supplemented by following requirement except where specific type is indicated.
 - .2 Nails, spikes and staples to NBC 9.23.3 except:
 - .3 Use common spiral nails and spiral spikes except where indicated otherwise.
 - .4 Use hot galvanized finish steel for exterior work, interior high humidity areas and for pressure treated lumber except where indicated otherwise.
 - .5 Bolt, nut, washer, screw and pin type fasteners: with hot-dip galvanized finish to CSA G164-M92 for exterior work, interior high humidity areas and for pressure treated lumber.

- .6 Use surface fastenings of following types, except where specific type is indicated.
 - .1 To hollow masonry, plaster and panel surfaces use toggle bolt.
 - .2 To solid masonry and concrete use expansion shield with lag screw, jute fibre or lead plug with wood screw.
 - .3 To structural steel use bolts through drilled hole, or welded stud-bolts or power driven self-drilling screws.
 - .4 Submit alternate fasteners for Engineer's approval.

Part 2 EXECUTION

2.1 Furring & Blocking

- .1 Install furring and blocking as required to space-out and support surface applied materials or other work as indicated.
- .2 Align and plumb faces of furring and blocking to tolerance of 1:600.

2.2 Nailers

- .1 Install wood nailers as indicated.
- .2 Except where indicated otherwise use material at least 40 mm (1-1/2") thick secured with 10 mm (3/8") bolts located within 300 mm (1 ft.) from ends of members and uniformly spaced at 1200 mm (4 ft.) between.
- .3 Countersink bolts where necessary to provide clearance for other work.

END OF SECTION

Part 1 GENERAL

NOT USED.

Part 2 PRODUCTS

2.1 INSULATION

- .1 Sound batt insulation: fabricated from friction fit batts, mineral fibre, 89 mm and 140 mm thickness, to fill stud cavity.
- .2 Safe'n'Sound Fire & Soundproofing Insulation by Roxul Inc. (or approved equal).

2.2 ACCESSORIES

- .1 Sealant: to CAN/CGSB-19.21-M87.
- .2 Tape for sealing as recommended by manufacturer.

Part 3 EXECUTION

3.1 WORKMANSHIP

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .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 WORK

- .1 Fire stopping and smoke seals within mechanical assemblies (i.e., inside of ducts, dampers) and electrical assemblies (i.e., inside cable trays) are specified in Division 23 Heating Ventilating and Air Conditioning, and 26 Electrical, respectively.

1.2 REFERENCES

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 ULC-S115-11, Fire Tests of Firestop Systems.

1.3 DEFINITIONS

- .1 Firestop: Sealant or other closure assembly with fire resistance rating of ½ to 4 hours.
- .2 Smoke seal: Sealant or other closure assembly with no fire resistance rating.

1.4 SAMPLES

- .1 Upon request of Departmental Representative, submit samples in accordance with submittal procedures of Section 01 10 00.
- .2 Submit duplicate 300 x 300 mm samples showing actual firestop material proposed for project.

1.5 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data for each typical firestopping assembly in accordance with submittal procedures of Section 01 10 00.
- .2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.

1.6 PRODUCT DATA

- .1 Submit product data in accordance with submittal procedures of Section 01 10 00.
- .2 Submit manufacturer's product data for materials and prefabricated devices, providing descriptions are sufficient for identification at job site. Include manufacturer's printed instructions for installation. Include the following:
 - .1 proof of labelling and listing by an accredited Certification Organization;
 - .2 the required F, FT, and FTH ratings;
 - .3 primers;
 - .4 supports and damming materials;
 - .5 reinforcement, anchors and fastenings.

1.7 QUALITY ASSURANCE

- .1 Provide the Work of this section executed by installers having minimum 5 years experience in the application in the application of firestopping and smoke seals, and trained and certified by the manufacturer of the products, systems and assemblies specified and proposed for use.
- .2 Arrange for the manufacturer's representative to review the drawings and site conditions prior to commencement of the installation of firestopping and smoke sealing materials, including inspection of substrate surfaces around penetrations and openings and recommendation of solutions for unique or peculiar situations.
- .3 Arrange for the manufacturer's representative to periodically visit the site to inspect installations prior to concealment, to advise on materials and procedures, and to report unsatisfactory conditions to Contractor.
- .4 Manufacturer's representative shall attend the final inspection and submit written certification that the products, systems and assemblies have been installed in accordance with the applicable ULC listing and the manufacturer's instructions.

Part 2 Products

2.1 MATERIALS

- .1 Fire stopping for concealed spaces: 12.7 mm thick gypsum board or 0.38 mm thick steel sheet, including all necessary supports and fasteners.
- .2 Fire stopping and smoke seal systems: tested and certified in accordance with CAN4-S115 for ratings specified or indicated, by an organization accredited by Standards Council of Canada.
 - .1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of ULC-S115 and not to exceed opening sizes for which they are intended [and conforming to special requirements specified in 3.5].
 - .2 Firestop system rating: in accordance with applicable building code and as follows:
 - .1 F rating: all locations except as follows.
- .3 Service penetration assemblies: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No.40 U19.
- .4 Service penetration firestop components: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No.40 U19.13 and ULC Guide No.40 U19.15 under the Label Service of ULC.
- .5 Fire-resistance rating of installed fire stopping assembly in accordance with [NBC] [OBC].
- .6 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

- .7 Fire stopping at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .8 Sealants for vertical joints: non-sagging.

2.2 SMOKE SEALS

- .1 Smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
 - .1 Vertical joints: non-sagging type.
 - .2 Horizontal joints: self-levelling type.

2.3 ACCESSORIES

- .1 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .2 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .3 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.

Part 3 Execution

3.1 PREPARATION

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

3.2 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.
- .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 a neat finish.

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

3.3 INSPECTION

- .1 Notify Consultant when ready for inspection and prior to concealing or enclosing firestopping materials and service penetration assemblies.

3.4 SCHEDULE

- .1 Firestops and smoke seals in architectural and structural assemblies:
- .1 Openings through firewall:
 - .1 Type JF:
 - .2 FT Rating: [4] hours.
 - .2 Edge of floor slabs at exterior wall:
 - .1 Type: PJ
 - .2 F rating: to match floor assembly rating.
 - .3 Maximum allowable firestop joint width: to suit joint condition.
 - .4 Movement capability: [NTD: indicate compression and/or extension design conditions].
 - .3 Opening at junction of floor and interior wall:
 - .1 Type: JF.
 - .2 F rating: to match floor assembly rating.
 - .3 Maximum allowable firestop joint width: to suit joint condition.
 - .4 Movement capability: [NTD: indicate compression and/or extension design conditions].
 - .4 Static floor openings:
 - .1 Type: JF.
 - .2 F rating: to match floor assembly rating.
 - .3 Maximum allowable firestop joint width: to suit joint condition.
 - .5 Dynamic floor openings between separate floor structures:
 - .1 Type: JF.
 - .2 F rating: to match floor assembly rating.
 - .3 Maximum allowable firestop joint width: to suit joint condition.
 - .4 Movement capability: [NTD: indicate expected compression or extension design condition].
 - .6 Top of fire-resistance rated masonry and gypsum board partitions.
 - .1 Type: HW
 - .2 F rating: to match partition rating.
 - .3 Maximum allowable firestop joint width: to suit joint condition.
 - .4 Movement capability to suit expected deflection:
 - .1 Expected floor deflection: [__] mm.
 - .2 Expected roof deflection: [__] mm.
 - .7 Intersection of fire-resistance rated masonry and gypsum board partitions.
 - .1 Type: WW

-
- .2 F rating: to match partition rating.
 - .8 Static partition wall openings
 - .1 Type: JF
 - .2 F rating: to match partition wall rating.
 - .3 Maximum allowable firestop joint width: to suit joint condition.
 - .9 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.
 - .1 Type: WW
 - .2 F rating: to match partition rating.
 - .3 Maximum allowable firestop joint width: to suit joint condition.
 - .4 Movement capability: [NTD: indicate expected compression or extension design condition].
 - .2 Refer to mechanical and electrical specifications for firestops and smoke seals at service penetrations.

3.5 CLEAN UP

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

Part 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 that does not bond to sealant.
- .5 Primers: sealant manufacturer's type.
- .6 Cleaners: as recommended by sealant manufacturers.
- .7 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%

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 SECTIONS

- .1 Section 08 80 50 Glazing: Glass surface to receive film application.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM E84-15a Standard Test Method for Surface Burning Characteristics of Building Materials
- .2 International Window Film Association (IWFA)
 - .1 IWFA Visual Quality Standard for Applied Window Film 1999.
- .3 National Fire Protection Association
 - .1 NFPA 101-2015 Life Safety Code

1.3 SUBMITTALS

- .1 Submittals in accordance with submittal procedures of Section 01 10 00.
- .2 Product Data: submit WHMIS MSDS - Material Data Sheets in accordance with submittal procedures of Section 01 10 00.
- .3 Submit shop drawings and product data in accordance with submittal procedures of Section 01 10 00.
- .4 Submit samples in accordance with submittal procedures of Section 01 10 00.
 - .1 Submit duplicate 300 x 300 mm samples of film and release sheet or backing material.
 - .2 Submit one [500] x [500] x mm sample of film installed on [6] mm thick clear plate glass.
- .5 Submit test reports in accordance with submittal procedures of Section 01 10 00.
 - .1 Submit test reports from approved independent testing laboratory, certifying film's compliance with specified requirements.
- .6 Submit closeout submittals in accordance with closeout procedures of Section 01 10 00.
 - .1 Provide operation and maintenance data for window film.
 - .2 Follow manufacturers written instructions for care and maintenance of decorative film.
 - .3 Use only cleaning solution recommended by manufacturer for regularly scheduled cleaning of decorative film.

1.4 MOCK-UP

- .1 Construct mock-up in accordance with submittal procedures of Section 01 10 00.
- .2 Construct mock-up of one of each typical installation. Mock-up may be part of finished work.
- .3 Allow 24 h for inspection of mock-up by Consultant before proceeding with waterproofing work.

1.5 QUALITY ASSURANCE

- .1 Film applicator: applied by applicator trained and approved by manufacturer for application of its products.
- .2 Applicators: minimum 5 years proven experience.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original sealed packaging with manufacturer's labels legible and seals intact.
- .2 Store materials elevated from contact with the ground, and protected from moisture and direct sunlight. Store materials in accordance with manufacturers written instructions.
- .3 Provide and maintain dry, off-ground weatherproof storage.
- .4 Store rolls of film flat on cross supports. Do not stand rolls of film on end.
- .5 Remove from storage, in quantities required for same day use.

1.7 ENVIRONMENTAL AND SAFETY REQUIREMENTS

- .1 Comply with requirements of Workplace hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.
- .3 Do not apply film until all dust generating operations are completed and the area has been cleaned.

1.8 WARRANTY

- .1 For Work of this Section, the 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C" is extended to 10 years.
- .2 Ensure warranty includes items as follows:

- .1 Maintaining adhesion properties without blistering, bubbling or delaminating from glass surface.
- .2 Maintaining appearance without discolouration.
- .3 Removing, replace and reapply defective materials.
- .4 In event of product failure under warranty terms, remove and re-apply film without glass replacement at no cost to NRC.

Part 2 Products

2.1 PRODUCTS

- .1 Decorative Graphic Window Film: Polyester film, pressure sensitive with visible light transmittance and reflectance of 50% and 20% respectively when measured on 6 mm thick clear glass. Pattern: horizontal bars 60 mm long by 3 mm wide, spaced 1.5 mm vertically and 3 mm horizontally. Fire performance Type A as defined in NFPA 101 when tested to ASTM E84.
 - .1 Acceptable product and manufacturer: Fasara Paracell as manufactured by the 3M Company.

2.2 SHOP FABRICATION

- .1 Apply and attach film to glass in accordance with manufacturer's written instructions.
- .2 Use only water and film slip solution on glass to facilitate positioning of film.
- .3 Clean glass before beginning installation using neutral cleaning solution.
- .4 Ensure no deleterious material adheres to glass by scraping surface of glass using industrial razors.
- .5 Ensure dust, grease, and chemical residue are removed from surface of glass before installation of film.
- .6 Lay out film on glass to ensure film edges will be captured behind window stops.
- .7 Cut film edges straight and square to within 3 mm of edge of panel.
- .8 Splicing:
 - .1 Splice film only when glass is greater in width than film.
 - .2 Splice film only after receipt of written approval from Consultant.
 - .3 Use butt factory edges only.
- .9 Install decorative film to glass panels ensuring no blisters, bubbles, scratches, edge defects or distortions.
- .10 Ensure removal of excess water from between film and glass.

- .11 Examine film applied to glass under natural daylight and identify cracks, blisters, bubbles, discoloration, edge defects or other anomalies that may cause film to delaminate, or cause vision transparency or distortion problems.
- .12 Deliver glass panels complete with decorative film installed and labels intact and legible to site in accordance with manufacturer's recommendations for handling, transportation and storage.

Part 3 Execution

3.1 INSTALLATION

- .1 Install glass panels with applied film in glazing frames as indicated and in accordance with manufacturer's instructions and requirements of Section 08 80 50.
- .2 Installed glass and film shall have orientation of film level and properly aligned with surrounding frame.

3.2 INSTALLER'S INSPECTION

- .1 Perform visual Inspection at time of installation in accordance with IWFA - Visual Quality Standard for Applied Window Film.
- .2 Return to work place after 30 days but no longer than 40 days for final cleaning and inspection of installed film.
- .3 Remove and replace glass panel or film that continues to show blisters, bubbles, tears, scratches, edge defects or vision distortion in film when viewed under natural daylight from 2.0 m after 30 day period.
 - .1 Replace film that exhibits defects with newly installed film
 - .2 Re-inspect as specified.

3.3 FINAL CLEANING

- .1 Wash both sides of each glass panel and film using cleaning solution recommended by film manufacturer.

END OF SECTION

Part 1 GENERAL

Part 2 PRODUCTS

2.1 Materials

- .1 Non-loadbearing channel stud framing: to ASTM C645-83; 38mm (1-5/8"), 64mm (2-1/2"), 92mm (3-5/8"), 152mm (6") stud sizes as indicated on drawings; roll formed from 1.0mm (20 gauge) electrogalvanized steel sheet; for screw attachment of gypsum board. Knock-out service holes at 460 mm (1'-6") centres.
- .2 Floor and ceiling tracks: to ASTM C645-92b; in widths to suit stud sizes, 32 mm (1-1/4") flange height.
- .3 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.
- .4 Acoustical sealant: to CAN/CGSB-19.21-M87.
- .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.

Part 3 EXECUTION

3.1 Erection

- .1 Align partition tracks at floor and ceiling and secure at 600 mm (2'-0") oc maximum.
- .2 Place studs vertically at 600mm (24") oc 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.
- .3 Erect metal studding to tolerance of 1:1000.
- .4 Attach studs to bottom using screws.
- .5 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .6 Co-ordinate erection of studs with installation of door frames and special supports or anchorage for work specified in other Sections.
- .7 Provide wood blocking secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, and base and upper cabinets, attached to steel stud partitions.
- .8 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.
- .9 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.
- .10 Install steel studs or furring channel between studs for attaching electrical and other boxes.
 - .11 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.
 - .12 Install continuous insulating strips at end of walls at demountable office partitions to isolate studs from perimeter wall construction.
 - .13 Install two continuous beads of acoustical sealant at end of walls at demountable office partitions to isolate studs from perimeter wall construction.

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 (at perimeter and non-demountable partition walls).
- .2 Regular board: to CAN/CSA A82.27-M91 12.5mm (1/2") x 1200 mm (4'-0") wide x maximum practical length, square edge (at demountable partition walls).

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 Battens for wall board installations: Factory finished battens for square edge gypsum board, anodized aluminum material to match aluminum door frames.
- .7 Batten concealed clips: Continuous back up metal clip behind battens screen applied to back up components.
- .8 Wall base for demountable partitions: Preformed, extruded anodized aluminum to match door frames, 4" high, clip on type complete with back-up clips, manufactured corners.
- .9 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.
- .4 Install battens and continuous backing clips at all joints in square edge gypsum board and at vertical edges and top edge of square edge gypsum board installation.

3.3 Batten and Preformed Floor Base Application

- .1 Do not apply until gypsum board finish has been completed and painted and flooring has been installed.
- .2 Install base using applicable continuous backing clip system.
- .3 Install battens and continuous backing clips at all joints in square edge gypsum board and at vertical edges and top edge of square edge gypsum board installation.

3.4 Sound Attenuation Blanket

- .1 Sound insulation as noted under Section 072000 Insulation.

3.5 Control Joints

- .1 N/A.

3.6 Access Doors

- .1 N/A

3.7 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 RELATED SECTIONS

- .1 Division 22 Plumbing: Plumbing work above ceilings.
- .2 Division 23 Heating, Ventilating and Air Conditioning: HVAC work above ceilings.
- .3 Division 26 Electrical: Electrical work above ceilings; trim for recessed light fixtures: sound masking system.
- .4 Division 27 Communications: Work above ceilings; trim for recessed fixtures.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C423-09a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM C635-07, Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - .3 ASTM C636-08, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .4 ASTM E1264-08, Standard Classification for Acoustical Ceiling Products.
 - .5 ASTM E1414-11a¹ Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum.
 - .6 ASTM E1477-98a(2008), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
- .3 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2007, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 DESIGN REQUIREMENTS

- .1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.

1.4 SEISMIC DESIGN CRITERIA

- .1 Provide seismic restraint for ceiling suspension systems in accordance with the requirements of the NBC, and in accordance with requirements of ASTM E580 and good engineering practice.
 - .1 Contractor to provide third party seismic design and installation review by a professional Engineer licensed to practice in Ontario.
 - .2 Include provisions for all fixtures incorporated into or suspended from ceiling suspension system.

- .2 Provide ceiling suspension systems capable of withstanding effects of earthquake motions determined in accordance with NBC for site specific conditions.
 - .1 Provide connections and bracing as required to satisfy seismic criteria.

1.5 SUBMITTALS

- .1 Provide all listed submittals in accordance with submittal procedures of Section 01 10 00.
- .2 Submit triplicate 150 mm x 150 mm samples of each type of acoustical units, except as follows.
 - .1 Submit triplicate full size samples of acoustical unit type .
- .3 Submit one representative model of each type ceiling suspension system.
- .4 Submit manufacturer's product literature describing specified products, including their technical and physical properties.
 - .1 Include manufacturer's certificate of mix formulation compliance, including certification that products contain no more than 0.5% asbestos.
 - .2 Include WHMIS and Material Safety Data Sheets.

1.6 QUALITY ASSURANCE

- .1 Mock-up:
 - .1 Construct mock-ups in accordance with quality assurance requirements of Section 01 10 00.
 - .2 Construct ceiling suspension system mockup to show basic construction and assembly, treatment at walls, recessed fixtures, sound masking devices, splicing, interlocking, finishes, acoustical unit installation.
 - .3 Submit mock-up of each combination of suspension system and acoustical ceiling panel, in two typical application areas such as offices, meeting rooms, corridors, special areas.
 - .1 Construct mock-up 10 m2 minimum of each type acoustical panel ceiling including one inside corner and one outside corner where applicable.
 - .2 Construct mock-ups where directed.
 - .4 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with ceiling work.
 - .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original unopened packaging with labels intact.
- .2 Label cartons and packages indicating contents and locations for which each item is intended.
- .3 Do not deliver panels to job site until shortly before installation.
- .4 Protect on site stored or installed absorptive material from moisture and all other forms of damage.

- .5 Remove damaged or deteriorated materials from the site.
- .6 Store extra materials required for maintenance, where directed by Owner's representative Departmental Representative.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before beginning to install.
- .2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20- 40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

1.9 EXTRA MATERIALS

- .1 Provide extra materials of acoustic units in accordance with closeout requirements of Section 01 10 00.
- .2 Provide suspension system components amounting to 2% of gross ceiling area for each type required for project. Extra materials are from same production run as installed materials. Clearly identify each type.
- .3 Provide twenty (20) ceiling tiles for each pattern and type on project. Extra material shall be from the same production run as installed materials, in unopened packages. Clearly identify each type of acoustic unit, including colour and texture.
- .4 Deliver to Departmental Representative, upon completion of the work of this section.

1.10 SEQUENCING AND SCHEDULING

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Departmental Representative.
- .2 Do not commence installation until mechanical and electrical work above ceiling is complete.

1.11 COORDINATION

- .1 Coordinate installation of suspended ceiling system with construction of ceiling bulkheads.
- .2 Coordinate installation of suspended ceiling system with mechanical, electrical and other work so that interference is prevented and items such as diffusers, grilles, lights, fixtures and other items are properly located and supported as indicated or as directed by Departmental Representative.
- .3 Coordinate installation of ceiling suspension system and curved trim with erection of partition framing and installation of wallboard to ensure uniform width of reveal between curved trim and partition.

- .1 Manufacturer recommends installation of ceiling suspension system and curved trim prior to erection of adjacent partition and bulkhead framing to allow adjustment of curved partition to pre-fabricated curved trim.

Part 2 Products

2.1 SOURCE OF SUPPLY

- .1 Provide all suspension systems and acoustic panels as products of the same single manufacturer.

2.2 ACOUSTICAL SUSPENSION SYSTEM

- .1 Provide intermediate duty system to ASTM C635, as specified for each respective system.
- .2 Basic materials for suspension system: commercial quality cold rolled steel, zinc coated.
- .3 Provide acoustical suspension system specified for each respective acoustical ceiling panel, and as follows.
- .4 Exposed tee bar grid components: Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face, colour white. 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 wire, 2.6 mm diameter.
- .6 Hanger inserts: purpose made drilled threaded twist-expanded sleeve anchors suitable for rod or hanger wire installation, as applicable. Do not use inserts or anchors requiring powder activated driver.
- .7 Carrying channels: 38 x 12.7 mm channel, of 3 mm thick painted galvanized steel.
- .8 Accessories: splices, clips, wire ties, retainers and wall moulding as indicated complete with pre-fabricated corners, to complement suspension system components, as recommended by system manufacturer.

2.3 ACOUSTIC CEILING PANEL (ACP) AND SUSPENSION

- .1 Acoustic ceiling panel for suspended ceiling system: to CAN2-92.1.
 - .1 Flame spread rating of 25 or less.
 - .2 Noise reduction coefficient (NRC) designation of 0.70 to 0.75.
 - .3 Ceiling Attenuation Class (CAC): minimum 35.
 - .4 Light reflectance range: Actual LR of 0.85.
 - .5 Edge type: square.
 - .6 Colour: white.
 - .7 Standard size: 610 mm x 1 220 mm x 19 mm thick and 610 mm x 610 mm x 19 mm thick, as indicated.
 - .8 Custom size: to be field cut and edge finished as required and as indicated.

- .9 Shape: flat.
- .10 Acceptable products and manufacturers:
 - .1 Armstrong Ultima;
 - .2 CGC Mars.
 - .3 Certainteed Symphony M.
- .2 Suspension Systems for Use with ACP:
 - .1 Acceptable products and manufacturers:
 - .1 Prelude XL as manufactured by Armstrong.
 - .2 Donn DX/DXL as manufactured by CGC Inc.,
 - .3 Classic Stab as manufactured by Certainteed
 - .2 Colour: flat white

2.4 SUSPENSION SYSTEM TRIM

- .1 Suspension trim system, straight and custom curved to suit installation, as indicated and as specified:
 - .1 Acceptable product and manufacturer: Compasso Suspension Trim as manufactured by CGC.
 - .2 Acceptable alternate product and manufacturer: Axiom Perimeter Trim as manufactured by Armstrong World Industries.
 - .3 Acceptable alternate product and manufacturer: Cloud Perimeter Trim as manufactured by Certainteed.
- .2 Trim: vertical face width to suit application unless indicated otherwise, with horizontal legs to match ceiling grid, with hems formed for attachment to mounting clips, complete with all necessary manufacturer's standard trim and accessories.
- .3 Splice plate: steel finished to match trim, snap-in fit.
- .4 Attachment clips: Hot dipped galvanized and finished to match trim, snap-in fit.

2.5 SEISMIC SUPPORT COMPONENTS

- .1 Provide all necessary seismic components in accordance with approved shop drawings, including but not limited to compression posts, stainless steel aircraft cable, turnbuckles, eyebolts, clips, cross-tee connections and anchors.

Part 3 Execution

3.1 EXAMINATION

- .1 Prior to beginning ceiling installation work, examine the installation areas and identify all areas of potential interference between ceiling components and components of other trades. Report all areas so designated to the Departmental Representative Departmental Representative.

- .2 Do not commence installation work in areas of interference until interference has been resolved or accepted. Commencement of the work in areas of interference signifies acceptance of the conditions.

3.2 SUSPENSION SYSTEM INSTALLATION

- .1 Installation: in accordance with ASTM C636 except where specified otherwise.
- .2 Install suspension system to manufacturer's instructions and Certification Organizations tested design requirements.
- .3 Do not erect ceiling suspension system until work above ceiling has been inspected by Departmental Representative.
- .4 Secure hangers to overhead structure using attachment methods as indicated acceptable to Departmental Representative.
 - .1 Do not use powder actuated fastening devices at any time or place in this Work.
- .5 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .6 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width system according to reflected ceiling plan.
- .7 Ensure suspension system is co-ordinated with location of related components.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles and speakers.
- .10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Finished ceiling system to be square with adjoining walls and level within 1:1000.

3.3 EXPANSION JOINTS.

- .1 Erect two main runners parallel, 50 mm apart, on building expansion joint line and where indicated.
- .2 Do not extend ceiling panels across building expansion joints.
- .3 At joint in ceiling suspension system, lay in strip of acoustic panel, 25% narrower than space between two "T" bars.

3.4 INSTALLATION OF TRIM

- .1 Install in accordance with approved shop drawings and manufacturer's instructions.
- .2 Use attachment clips to secure trim to each main tee.
- .3 Use splice plates for joining adjacent trim pieces.
- .4 Use 90 degree corner trim pieces at corners.
- .5 Finished installation to be smoothly curving line to accurate radius, free of distortion and kinks, and shall form a reveal of uniform width at partitions and bulkheads.

3.5 SEISMIC RESTRAINT

- .1 Install seismic restraint for suspended ceiling system and all associated fixtures in accordance with approved shop drawings.
- .2 Minimum seismic tension bracing for ceilings shall be installed as follows:
 - .1 At perimeter of each suspended ceiling and at the end of each grid run, install additional hanger wire splayed upward at 45 degrees and attached to structure.
 - .2 In field of ceiling, install hanger wires at points 12 feet OC in both directions splayed upward 45 degrees from each point in four directions and secured to the underside of the structure.
- .3 Tighten bracing wires without deforming the ceiling grid beyond specified tolerances.
- .4 Seismic tension bracing is not required in areas in which the maximum horizontal dimension is less than or equal to 12 feet and which are bounded on all sides by partitions anchored to floor slab and underside of structural deck with seismic anchorage.
- .5 The professional engineer responsible for the production of the shop drawings setting out the requirements for seismic restraint of the suspension systems shall provide periodic field review during construction and shall submit reports in accordance with quality assurance requirements of this specification. The cost of this field inspection shall be included in the Guaranteed Price.

3.6 ACOUSTICAL PANEL INSTALLATION

- .1 Install acoustical panels in ceiling suspension system, supported on all edges, in accordance with manufacturer's current printed instructions.
- .2 Touch up edges of panels cut to fit site conditions to conceal core and to match face.

3.7 INTERFACE WITH OTHER WORK

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, to be built into acoustical ceiling components.

3.8 TOUCH-UP AND CLEANING

- .1 Touch up scratches, abrasions, voids and other defects in surfaces.

- .2 Replace damaged units that cannot be touched up to satisfaction of Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 29 00 Gypsum Board: Wall repairs at surfaces to receive resilient base.
- .2 Section 09 68 13 Tile Carpeting: Floor finish.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM F1861-08 Specification for Resilient Wall Base.

1.3 PRODUCT DATA

- .1 Submit manufacturer's product literature describing specified products, including their technical and physical properties.
 - .1 Include manufacturer's certificate of mix formulation compliance, including certification that products contain no more than 0.5% asbestos.
 - .2 Include WHMIS and Material Safety Data Sheets.

1.4 SAMPLES

- .1 Submit samples in accordance with submittal procedures of Section 01 10 00.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base.

1.5 QUALITY ASSURANCE

- .1 Installer shall have five (5) years of documented experience installing resilient base products.
- .2 Provide proof of experience at request of Departmental Representative.

1.6 MOCKUP

- .1 Include resilient base and accessories in mockups specified for each floor covering product specified, in accordance with requirements of Section 01 10 00.
- .2 Accepted mockup may form part of finished Work.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store packaged materials in original containers with manufacturer's seals and labels intact.
- .2 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness. Store rolled goods on end.
- .3 Store materials on site for site conditioning at temperatures between 18°C and 24°C for at least 48 hours immediately before installation.
- .4 Protect from intense or direct sunlight until installation is complete and adhesives are fully cured.

1.8 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for resilient base for incorporation into manual specified in Section 01 10 00.

1.9 EXTRA MATERIALS

- .1 Provide extra materials of each type of resilient base materials and adhesives in accordance with closeout procedures of Section 01 10 00.
- .2 Provide 5% of each colour, pattern and type of resilient base material required for project for maintenance use.
- .3 Extra materials to be in one piece and from same production run as installed materials.
- .4 Clearly identify each resilient base product and each container of adhesive.
- .5 Deliver to Departmental Representative, upon completion of the work of this section.
- .6 Store where directed by Departmental Representative.

1.10 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at resilient base installation area above 20°C for 48 hours before, during and 48 hours after installation.
- .2 Protect materials from intense or direct sunlight during storage and until installation is complete and adhesives are fully cured.

Part 2 Products

2.1 RESILIENT WALL BASE (RB)

- .1 Resilient base: to ASTM F1861, Type TS or TP, rubber, Style B-cove minimum for resilient floor, Style A-straight toeless for carpeted areas, in maximum practical length, 3 mm thick, 100mm high.
 - .1 Acceptable products and manufacturers:
 - .1 Pinnacle Rubber Base by Roppe,
 - .2 Traditional Wall Base by Johnsonite.
 - .3 Equivalent products from Amtico, Armstrong.
 - .2 Allow for one colour to be selected by Departmental Representative from manufacturer's full range.
 - .1 Similar to Johnsonite, Traditional Wall Base
 - .1 Colour: 48 Grey.

2.2 RESILIENT BASE COLOUR SCHEDULE

- .1 Allow for one colour per functional area for each type of resilient base specified, selected from manufacturer's full range.

2.3 RESILIENT BASE INSTALLATION ACCESSORIES

- .1 Primers and adhesives: of types recommended by resilient products manufacturer for specific material on applicable substrate, above, on or below grade.
- .2 Adhesives for contoured resilient wall base: as recommended by manufacturer.

- .1 Porous substrate: Johnsonite #960 Acrylic Cove Base Adhesive.
- .2 Non-porous substrate: Johnsonite #945 Contact Bond Adhesive.
- .3 Double sided tape adhesive for all substrates: Johnsonite Power Tape.

Part 3 Execution

3.1 SITE VERIFICATION OF CONDITIONS

- .1 Inspect areas and surfaces to receive new resilient base and report conditions detrimental to performance of the Work and satisfactory installation in writing to the Departmental Representative.
- .2 Ensure that surfaces to receive base have been repaired under Section 09 29 00 and are sound, dry, clean and smooth.
- .3 Do not proceed with the work until detrimental conditions have been corrected.

3.2 RESILIENT BASE APPLICATION

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions.
- .7 Cope internal corners.
- .8 Form external corners from resilient base as follows:
 - .1 Bend the base and flip the toe to stretch it.
 - .2 Reverse the bend and shave a strip 6 mm wide to a depth $\frac{1}{4}$ the thickness of the base from the back of the base at corner location.
 - .3 Apply hot melt or solvent-based adhesive to outside corners, minimum 100 mm back from corner.
 - .4 Install base.
- .9 Use toeless type base where floor finish will be carpet, coved type elsewhere.
- .10 Install toeless type base before installation of carpet on floors.
- .11 Heat weld base joints in accordance with manufacturer's printed instructions.

3.3 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, floor and base surface to flooring manufacturer's printed instructions.
- .3 Departmental Representative will arrange for NRC Cleaners to seal and wax floor.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 65 13 Resilient Base and Accessories: Resilient base for carpeted areas.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No.27.6-M91(R2013), Textile Test Methods - Flame Resistance - Methemine Tablet Test for Textile Floor Coverings.
 - .2 CAN/CGSB-4.129-93, Carpet for Commercial Use.
- .2 Carpet and Rug Institute (CRI)
 - .1 CRI-104-96, Standard Installation of Commercial Carpet.
 - .2 IAQ Carpet Testing Program.
- .3 National Floor Covering Association (NFCA)
 - .1 Floor Covering Specification Manual.
- .4 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102.2-10, Surface Burning Characteristics of Flooring, Floor Covering and Miscellaneous Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit the following in accordance with submittal procedures of Section 01 10 00.
- .2 Submit verification to demonstrate compliance with CAN/ULCS102.2 for floor covering.
- .3 Submit proof that carpet has been tested and passed the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute (CRI) and the Canadian Carpet Institute (CCI).
- .4 Submit carpet schedule using same room designations indicated on drawings.
- .5 Submit carpet manufacturer's installation instructions: Indicate special procedures and perimeter conditions requiring special attention.
- .6 Submit certification and description of carpet reclamation and/or recycling process.

1.4 PRODUCT DATA

- .1 Submit product data in accordance with submittal procedures of Section 01 10 00.
- .2 Submit product data sheet for each carpet, undercushion, adhesive, carpet protection and subfloor patching compound.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam adhesive. Indicate VOC content.

- .4 Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colours, and methods of installation.

1.5 SAMPLES

- .1 Submit samples in accordance with submittal procedures of Section 01 10 00.
- .2 Submit duplicate pieces of each type, size and colour of carpet tile specified.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

1.7 QUALIFICATIONS

- .1 Installer Qualifications:
 - .1 Flooring contractor requirements.
 - .1 Specialty contractor normally engaged in this type of work, with prior experience in installation of these types of materials.
 - .2 Certified by carpet manufacturer prior to bid submission.
 - .3 Must not sub-contract labour without written approval of Departmental Representative.
 - .2 Be responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturers written instructions.

1.8 REGULATORY REQUIREMENTS

- .1 Carpet tile shall be tested to CAN/ULC-S102.2 and have a maximum flame spread rating of 300 and maximum smoke developed rating of 450 in accordance with NBC requirements
- .2 Indoor Air Quality: compliance with CRI/CCI Green Label Indoor Air Quality Program, CRI/CCI-IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI/CCI-IAQ label.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Label packaged materials.
- .2 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.
- .3 Store carpeting and accessories in location as directed by Departmental Representative. Store carpet and adhesive at minimum temperature of 18oC and relative humidity of maximum 65% for minimum of 48 hours before installation.

- .4 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.
- .5 Store materials in area of installation for minimum period of 48 hours prior to installation.
- .6 Modular carpet: store on pallet form as supplied by Manufacturer. Do not stack pallets.

1.10 ENVIRONMENTAL REQUIREMENTS

- .1 Moisture: Ensure substrate is within moisture limits and alkalinity limits prescribed by manufacturer. Prepare moisture testing and provide report to Departmental Representative.
- .2 Temperature: Maintain ambient temperature of not less than 18°C from [48] hours before installation to at least 48 hours after completion of work.
- .3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.
- .4 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .5 Ventilation:
 - .1 Arrange with Departmental Representative to operate existing building ventilation system to provide continuous ventilation during and after carpet application. 24 hours per day during installation and for 7 days after completion of carpet installation.

1.11 EXTRA MATERIALS

- .1 Provide extra materials of carpet, carpet base, and adhesives in accordance with closeout requirements of Section 01 10 00.
- .2 Provide modular tile maintenance material in quantity equivalent to minimum 5% of each colour, pattern and type of carpeting installed. Minimum one full box of each.
- .3 Extra materials to be from same production run as installed materials.
- .4 Identify each package of carpet and each container of adhesive.
- .5 Deliver to site and store where directed by Departmental Representative.

Part 2 Products

2.1 MANUFACTURERS

- .1 Specification is based on products of Shaw Contract Group. Products of other modular carpet manufacturers may be acceptable subject to review and acceptance by the Departmental Representative for conformance to design concept and specifications.
- .2 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute IAQ requirements.

2.2 MODULAR CARPET (CPT)

- .1 Provide carpet tile in dimensions, patterns and colours as specified.
- .2 Construction: tufted.
- .3 Pile Surface Appearance:
 - .1 Multi-level pattern loop.
- .4 Pile fibre: to CAN/CGSB-4.129.
 - .1 Nylon.
- .5 Gauge: 1/12.
- .6 Stitch Rate: 10 per inch.
- .7 Tuft Density: 6,511 ounces per square yard.
- .8 Finished Pile Thickness: 0.094 inch.
- .9 Yarn Dye Method: 100% solution dyed.
- .10 Colourization: multiple colour tones.
- .11 Colourfastness to light: to CAN/CGSB-4.2No.18.3.
- .12 Primary Backing: woven.
- .13 Secondary Backing: synthetic.
- .14 Soil protection: manufacturer's protective treatment.

2.3 INSTALLATION ACCESSORIES

- .1 Adhesive:
 - .1 Pressure sensitive type: recommended by carpet manufacturer for direct glue down installation of modular carpet or speciality backed carpets.
- .2 Primers: waterproof, type recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
- .3 Sub-floor filler and leveller to ASTM F710, moisture-, mildew-, and alkali-resistant material, with 3000 psi compressive strength when cured:
 - .1 2 part latex-type filler requiring no water and packaged separately in correctly proportioned units as recommended by flooring manufacturer for use with their product.
- .4 Reducer and transition strips: resilient wedge profile transition of thermoplastic rubber compound, 457 mm wide from 0 to thickness to suit transition.
 - .1 Acceptable product: Subfloor Leveller as manufactured by Roppe.

- .5 Transition and edge strips: purpose made solid vinyl strip, tapered profile, dimensions to provide flush meeting with adjacent surfaces, color to be selected by Departmental Representative from manufacturer's standard range.
 - .1 Provide "J" or "T" profiles as necessary to protect edges at transitions.
 - .2 Tapered vinyl or rubber edging, profile and thickness to suit flooring condition, with lip to extend under floor finishes, shoulder flush with top of adjacent floor finish. Colour selected by Departmental Representative from manufacturer's full range.
- .6 Carpet protection: non-staining heavy duty kraft paper.
- .7 Subfloor patching compound: Portland cement base filler, mix with latex and water to form a cementitious paste.

2.4 CARPET TILE SCHEDULE

- .1 CPT-1: (main colour): Ignite Tile, Colour: Oxidize 48531, Size: 460mm x 915mm by Shaw Contract Group.
- .2 CPT-2: Colour: glowing 81211 (yellow), Size: 215mm x 915mm by Shaw Contract Group.
- .3 CPT-3: Colour: purple 81991 (purple), Size: 215mm x 915mm by Shaw Contract Group.
- .4 CPT-4: Colour: hyper green 81326 (green), Size: 215mm x 915mm by Shaw Contract Group.
- .5 CPT: Colour: hyper blue 81436 (blue), Size: 215mm x 915mm by Shaw Contract Group.

Part 3 Execution

3.1 SUB-FLOOR TREATMENT

- .1 Concrete shall be inspected to determine special care required to make it a suitable foundation for carpet. Fill cracks 3 mm wide and level protrusions over 0.8 mm with appropriate and compatible latex or polymer fortified patching compound.
- .2 Do not exceed manufacturer's recommendations for patch thickness.
- .3 Large patch areas are to primed with a compatible primer.
- .4 Concrete substrates shall be cured, clean and dry.
- .5 Concrete substrates shall be free of paint, dirt, grease, oil, curing or parting agents, and other contaminates, including sealers, that may interfere with the bonding of the adhesive.
- .6 Wherever a powdery or porous concrete surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for glue-down installation.

3.2 PREPARATION

- .1 Prepare floor surfaces in accordance with CRI 104 Standard for Installation of Commercial Carpet.
- .2 Pre-condition carpeting following manufacturer's printed instructions.

3.3 SUB-FLOOR TRANSITION LEVELLER

- .1 Provide pre-fabricated resilient subfloor leveller at all transitions between resilient tile flooring and adjacent flooring types where elevation difference is 12.7 mm or less.
- .2 Trim width of leveller to suit difference in elevation.

3.4 INSTALLATION OF ADHESIVE

- .1 Review substrate and environmental conditions to ensure they are in accordance with adhesive manufacturer's written requirements.
- .2 Mix and apply adhesives in strict accordance with manufacturer's written instructions, observing recommended application techniques and spread rates, open times and safety precautions.
- .3 Apply adhesive to fully cover substrate using appropriate notched trowel. Use new trowels when existing trowels become worn. Self-adhesive carpet tile installation shall be in accordance with manufacturer's recommendations.

3.5 INSTALLATION OF CARPET TILE

- .1 Install modular carpet in accordance with manufacturer's printed instructions and in accordance with NFCA guidelines using tools, materials, methods and sequence of work as recommended
- .2 Install carpet tile as indicated in areas and patterns detailed on drawings and/or indicated on the project Finish Schedule.
- .3 Install carpet tile adhered to substrate in accordance with NFCA requirements and carpet tile manufacturer's recommendations.
- .4 Install carpet tile starting in the centre of the room and working outwards towards perimeter walls. Other acceptable commercial practices can be substituted as the starting point to provide a border width equal to at least half a tile.
- .5 Install carpet tile with butted joints straight, in true plane with carpet nap in pattern indicated. Ensure dye lot, pattern, and texture match within any one area. All patterns shall be pre-approved by Departmental Representative.
- .6 Border tiles shall be scribed to vertical surfaces and around architectural, mechanical, electrical and furniture fixtures, fitments and floor projections, and cut and fitted into place after the field tile has been laid and before wall base has been installed.
- .7 Install carpet tile into recesses and closets adjacent to carpeted areas and continuous through doorways and other openings for a uniform appearance.

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- .8 Do not bridge building expansion joints with carpet tile; provide for movement.
 - .9 Tiles should be carefully rolled in each direction with a roller of size and weight as recommended by carpet tile manufacturer to ensure full adhesion of tile to the substrate and again when entire room is complete to ensure uniform adhesion.
 - .10 Clean excess adhesive off of tiles after installation using methods and materials recommended by flooring and adhesive manufacturer.

3.6 COMPLETION

- .1 On completion of work, trim all loose pieces of face yarn with scissors, remove all carpet tile scraps and other refuse from areas and rooms worked in and from job site, and inspect and correct other apparent defects.
- .2 Vacuum carpet tile with a beater type vacuum to remove dirt. Remove any soiled spots with proper cleaner recommended by carpet tile manufacturer for each type of carpet tile installed.

3.7 PROTECTION OF FINISHED WORK

- .1 Prohibit traffic on carpet for a period of 24 hours until adhesive is cured.
- .2 Install carpet protection to satisfaction of Departmental Representative.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Work of this Section includes surface preparation and paint finishes for all new and previously painted exposed and semi-concealed surfaces within the area under contract for which a paint formula is specified.
 - .1 Semi-concealed areas include inside of light troughs and valences, behind grilles, and projecting edges above and below sight lines.
 - .2 Moisture testing of substrates.
 - .3 Provision of safe and adequate ventilation as required where toxic and/or volatile/flammable materials are being used over and above temporary ventilation supplied by others.
- .2 Re-painting previously painted surfaces also includes:
 - .1 Material and installation of site applied paint finishes painting pre-existing painted surfaces.
 - .2 Surface preparation of substrates as required for acceptance of paint, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to limits defined under MPI Repainting Maintenance Manual requirements.
 - .3 Specific pre-treatments noted herein or specified in the MPI Repainting Maintenance Manual.
 - .4 Sealing/touch-up, spot priming, and/or full priming surfaces for repainting in accordance with MPI Repainting Maintenance Manual requirements.

1.2 REFERENCES

- .1 Environmental Protection Agency (EPA)
 - .1 EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
- .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2005.
 - .2 MPI Maintenance Repainting Manual 2004
- .4 Current National Fire Code of Canada

1.3 PERFORMANCE REQUIREMENTS

- .1 Unless specified otherwise, provide materials and perform the work in accordance with the MPI Premium grade requirements for each system specified.

1.4 QUALITY ASSURANCE

- .1 Qualifications and Experience:

- .1 Painting Subcontractor shall have a minimum of five years proven satisfactory experience. Submit list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2 Journeymen shall be qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
- .3 Apprentices shall work under direct supervision of qualified trades person in accordance with trade regulations.
- .2 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .3 Retain purchase orders, invoices and other documents to prove conformance with specification requirements when requested by Departmental Representative.

1.5 SCHEDULING

- .1 Submit work schedule for various stages of painting to Departmental Representative for review. Submit schedule minimum of 10 Working Days in advance of proposed operations.
- .2 Paint occupied facilities in accordance with approved schedule.
- .3 Obtain written authorization from Departmental Representative for changes in work schedule.
- .4 Schedule painting operations to prevent disruption of occupants.

1.6 SUBMITTALS

- .1 Submittals in accordance with submittal procedures of Section 01 10 00.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used prior to ordering materials. Do not order materials until list has been accepted.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 10 00 – General Instructions. Indicate VOCs during application and curing.
- .3 Samples:
 - .1 Submit full range colour sample chips for review and selection. Indicate where colour availability is restricted.

- .2 Prepare samples with stepped application of finish system showing each separate coat, including primers and block fillers.
- .3 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating, and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
 - .1 3 mm plate steel for finishes over primed ferrous metal surfaces.
 - .2 3 mm wipe-coat galvanized plate steel for finishes over wipe-coated galvanized metal surfaces such as hollow metal doors and frames.
 - .3 3 mm galvanized plate steel for finishes over galvanized metal surfaces other than hollow metal doors and frames.
 - .4 13 mm birch plywood for finishes over wood surfaces.
 - .5 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .6 13 mm gypsum board of each type specified for finishes over each type of gypsum board specified and other smooth surfaces.
- .4 Include list of material and application for each coat of each sample. Label each sample as to location and application.
- .5 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Test reports and Certificates:
 - .1 Submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .1 Lead, cadmium and chromium: presence of and amounts.
 - .2 Mercury: presence of and amounts.
 - .3 Organochlorines and PCBs: presence of and amounts.
 - .2 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Closeout Submittals:
 - .1 Submit maintenance data for incorporation into manual specified in Section 01 10 00 include following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 MPI Environmentally Friendly classification system rating.

1.7 MOCK-UPS:

- .1 Construct mock-ups in accordance with quality assurance requirements of Section 01 10 00
 - .1 Provide 3 000 mm x 3 000 mm mock-up.
 - .2 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements of each interior finish system listed, with specified paint or coating showing selected colours, gloss/sheen, textures.

- .3 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
- .4 Locate where directed where indicated.
- .5 Allow 24 hours for inspection of mock-up before proceeding with work.
- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may not remain as part of finished work. Remove mock-up and dispose of materials when no longer required and when directed by Departmental Representative.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Pack, ship, handle and unload materials in accordance with manufacturer's written instructions.
- .2 Acceptance at Site:
 - .1 Identify products and materials with labels indicating:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well ventilated area with temperature range 7 degrees C to 30 degrees C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:
 - .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to each storage area.
 - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.

1.9 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Provide continuous ventilation for seven days after completion of application of paint.
 - .2 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
 - .3 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
 - .4 Provide minimum lighting level of 323 Lux (30 foot candles) on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Perform painting work when maximum moisture content of the substrate is below:
 - .1 12% for concrete, concrete masonry, clay masonry.
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
 - .2 Test for moisture using calibrated electronic Tramex type moisture meter. Test concrete floors for moisture using "cover patch test".
 - .3 Allow new concrete and masonry to cure minimum of 28 days.
 - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.

1.10 EXTRA MATERIALS:

- .1 Submit maintenance materials in accordance with closeout submittals requirements of Section 01 10 00.
- .2 Deliver extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels.
- .3 Quantity: provide one one-litre can of each type and colour of primer and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .4 Delivery, storage and protection: comply with Departmental Representative requirements for delivery and storage of extra materials.

1.11 WARNING:

- .1 **DO NOT USE SPRAY EQUIPMENT:** Only paint brush and roller will be accepted on this project.

Part 2 Products

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Acceptable Paint: Sherwin Williams or approved equal.

2.2 COLOURS

- .1 Submit proposed Colour Schedule to Departmental Representative for review..
- .2 Colour schedule:
 - .1 P1: Sherwin Williams, Elder White, SW 7014.
 - .2 P2: Sherwin Williams, Dynamic Blue, SW 6958.
 - .3 P3: Sherwin Williams, Gauntlet Grey, SW 7019.
 - .4 P4: Sherwin Williams, Overt Green, SW 6718.
 - .5 P5: Sherwin Williams, Bee, SW 6683.
 - .6 P6: Sherwin Williams, Verve Violet, SW 6975.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Departmental Representative for tinting of painting materials on site.
 - .1 For re-painting, the first coat in a two coat (Premium) repaint system shall be tinted slightly lighter colour than top coat to show visible difference between coats.
 - .2 For painting new surfaces, the second coat in three coat system shall be tinted slightly lighter colour than top coat to show visible difference between coats.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 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 @ 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 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.

2.5 INTERIOR PAINTING AND RE-PAINTING SYSTEMS

- .1 Galvanized metal: New interior doors, frames.
- .1 INT 5.3M – Waterborne Light Industrial Coating, MPI gloss level 5 (semi-gloss) finish.
- .2 Dressed lumber: including doors, door and window frames, casings, mouldings:
- .1 INT 6.3BB - Waterborne alkyd MPI gloss level 5 (semi-gloss) finish for interior doors in non-humid locations only.
- .3 Electrical backer boards.
- .1 INT 6.4P – Intumescent fire retardant alkyd coating, gloss level 1 (flat) finish, ULC listed.
- .4 Plaster and gypsum board walls: gypsum wallboard and textured finishes:
- .1 INT 9.2B - High performance architectural latex, gloss level 5 (semi-gloss) finish.
- .5 Plaster and gypsum board ceilings, soffits and bulkheads: plaster, gypsum wallboard and textured finishes:
- .1 INT 9.2B - High performance architectural latex, gloss level 1 (flat) finish.
- .6 Plastic laminate door trim and edges:
- .1 INT 6.4E Polyurethane varnish over semi-transparent stain, gloss level 5.
- .7 Concrete horizontal surfaces: Mechanical room floor and housekeeping pads:
- .1 INT 3.2L - Waterborne epoxy floor finish.

2.6 EXISTING PAINTED STEEL SURFACES

- .1 Paint system applicable to:
- .1 Existing painted steel windows.
- .2 Existing steel door frames to remain.
- .2 Provide specified paint system products or approved equal:
- .1 De-greaser: non-flammable, biodegradable synthetic safety solvent based on N-methyl 2-pyrrolidone containing no methylene chloride, methanol or benzenes, in gel and liquid form.

- .1 Acceptable product and manufacturer: Green Solve as manufactured by Cyndan Chemicals.
- .2 Primer: Pro-Cryl Universal Primer B66W00310 Off-White as manufactured by Sherwin Williams.
- .3 Top coat: Water Based Catalyzed Epoxy Part A B73-300 Series (Gloss) with Part B B73V300 Hardener as manufactured by Sherwin Williams.
- .4 Colour: as indicated on drawings.
 - .1 Tint first coat lighter than top finish coat.

Part 3 Execution

3.1 GENERAL

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Perform preparation and operations for interior re-painting of existing surfaces in accordance with MPI Maintenance Repainting Manual requirements except where otherwise specified.
- .3 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 EXAMINATION

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Stucco, plaster and gypsum board: 12%.
 - .2 Concrete: 12%.
 - .3 Clay and Concrete Block/Brick: 12 %.
 - .4 Wood: 15%.

3.3 INSPECTION REQUIREMENTS FOR RE-PAINTING WORK

- .1 Inspect existing interior surfaces requiring repainting and notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .2 Assume responsibility for preparation of surfaces with assessed degree of surface degradation up to and including DSD-2 as defined in MPI Maintenance Repainting Manual.

- .3 Where an assessed degree of surface degradation of DSD-0 to DSD-2 before preparation of surfaces for repainting is revealed to be DSD-3 or DSD-4 after preparation, notify Departmental Representative Do not begin repainting until Departmental Representative issues instruction.

3.4 PREPARATION

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint splatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
 - .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .2 Surface Preparation:
 - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
 - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.

- .5 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air or vacuum cleaning.
- .7 Touch up of shop primers with primer as specified.
- .8 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

3.5 APPLICATION

- .1 Apply paint by brush, roller, air sprayer, or airless sprayer. Conform to manufacturer's application instructions, including spreading rates, unless specified otherwise. Method of application shall be approved by Departmental Representative prior to commencement of work.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application is not permitted for standard paint products.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply each coat of paint in a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish inside of cupboards and cabinets as specified for outside surfaces.
- .10 Finish closets and alcoves as specified for adjoining rooms.

- .11 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 EXISTING PAINTED STEEL SURFACES

- .1 In addition to the requirements specified, prepare and apply coatings to the following surfaces:
 - .1 Stair railings, guardrails, stringers, risers and nosings.
 - .2 Hollow steel doors and frames to remain.
 - .3 Existing heat register louvered covers.
 - .1 At option of Contractor, register covers may be removed from site to paint shop for surface preparation and finish painting.
 - .2 For materials taken off site:
 - .1 Prepare inventory of items removed and submit to Departmental Representative.
 - .2 Transport, store and handled all items taken off site protected from all loss, deterioration and damage.
 - .3 Re-finish as specified, including testing.
 - .4 Transport to site and re-install.
- .2 Testing Requirements:
 - .1 Prior to complete application, prepare surfaces and apply coatings as specified, for three test areas.
 - .2 Allow paint to dry one week and test for adhesion in presence of Departmental Representative.
 - .3 If adhesion is poor, perform additional abrasion and re-test.
 - .4 Repeat until adhesion is acceptable.
- .3 Abrade existing painted metal surfaces to provide required surface texture.
- .4 Grind all weld burn marks down to smooth, clean, bare metal.
- .5 Clean all particulate matter from surface.
- .6 De-grease existing painted and new bare metal surfaces with specified de-greaser in liquid and/or gel form to suit surface.
- .7 Apply specified primer to all painted and bare metal surfaces in strict accordance with manufacturer's instructions.
- .8 Apply two coats of specified top coat to primed surfaces in strict accordance with manufacturer's instructions.

3.7 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.

- .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.

3.8 SITE TOLERANCES

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface when viewed using final lighting source.
- .2 Floors and ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat shall exhibit uniformity of colour and uniformity of sheen across full surface area.

3.9 FIELD QUALITY CONTROL

- .1 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .2 Cooperate with inspection and provide access to areas of work.
- .3 Retain purchase orders, invoices and other documents to prove conformance with specified requirements when requested by Departmental Representative.

3.10 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.

- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 10 00 – General Instructions.
- .2 Shop drawings; submit drawings stamped and signed by Contractor registered or licensed in Province of Ontario, Canada.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .4 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.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 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 one (1) draft copy of 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 one (1) set of reproducible mechanical drawings. Provide sets of 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 MAINTENANCE

- .1 Furnish spare parts in accordance with Section 01 10 00 – General Instructions as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers.
- .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

- .1 Do painting in accordance with generally accepted industry best practices.
- .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.

3.3 FIELD QUALITY CONTROL

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

3.4 DEMONSTRATION

- .1 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.
- .2 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .3 Instruction duration time requirements as specified in appropriate sections.

- .4 Departmental Representative may record these demonstrations on video tape for future reference.

3.5 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE)
 - .1 ASHRAE Standard 90.1-[01], Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA co-sponsored; ANSI approved; Continuous Maintenance Standard).
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM B209M-[04], Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate [Metric].
 - .2 ASTM C335-[04], Standard Test Method for Steady State Heat Transfer Properties of Horizontal Pipe Insulation.
 - .3 ASTM C411-[04], 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 C533-[2004], Calcium Silicate Block and Pipe Thermal Insulation.
 - .6 ASTM C547-[2003], Mineral Fiber Pipe Insulation.
 - .7 ASTM C795-[03], Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
 - .8 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.
 - .2 CAN/CGSB-51.53-[95], Poly (Vinyl Chloride) Jacketing Sheet, for Insulated Pipes, Vessels and Round Ducts
- .4 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.
 - .2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .6 Manufacturer's Trade Associations
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (Revised 2004).

- .7 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-[03], Surface Burning Characteristics of Building Materials and Assemblies.
 - .2 CAN/ULC-S701-[01], Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .3 CAN/ULC-S702-[1997], Thermal Insulation, Mineral Fibre, for Buildings
 - .4 CAN/ULC-S702.2-[03], Thermal Insulation, Mineral Fibre, for Buildings, Part 2: Application Guidelines.

1.2 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.
- .2 TIAC ss:
 - .1 CRF: Code Rectangular Finish.
 - .2 CPF: Code Piping Finish.

1.3 SUBMITTALS

- .1 Submittals: in accordance with Section 01 10 00 – General Instructions.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.
- .3 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 10 00 – General Instructions.
- .4 Samples:
 - .1 Submit samples in accordance with Section 01 10 00 – General Instructions.
 - .2 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed. Mount sample on 12 mm plywood board. Affix label beneath sample indicating service.
- .5 Quality assurance submittals: submit following in accordance with Section 01 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.

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: specialist in performing work of this Section, and have at least three (3) years successful experience in this size and type of project, qualified to standards and member of TIAC.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with manufacturer's written instructions and Section 01 10 00 – General Instructions.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .3 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Storage and Protection:
 - .1 Protect from weather, construction traffic.
 - .2 Protect against damage.
 - .3 Store at temperatures and conditions required by manufacturer.
- .3 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.
 - .2 Place excess or unused insulation and insulation accessory materials in designated containers.
 - .3 Divert unused metal materials from landfill to metal recycling facility.
 - .4 Dispose of unused adhesive material at official hazardous material collections site.

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 Mineral fibre 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 A-6: flexible unicellular tubular elastomer.
 - .1 Insulation: with vapour retarder jacket or built in vapour barrier.
 - .2 Jacket: to CGSB 51-GP-52Ma.
 - .3 Maximum "k" factor: to ASTM C177 and ASTM C518.
 - .4 Flame Spread and Smoke Development Index: 25/50 rated to CAN/ULC-S102.
 - .5 Standard of Acceptance: Armacell AP Armaflex Tube Insulation or approved equivalent.

2.3 INSULATION SECUREMENT

- .1 Tape: self-adhesive, aluminum, reinforced, 50mm wide minimum.
- .2 Contact adhesive: quick setting.
- .3 Canvas adhesive: washable.
- .4 Tie wire: 1.5mm diameter stainless steel.
- .5 Bands: stainless steel, 19mm wide, 0.5mm thick.

2.4 CEMENT

- .1 Thermal insulating and finishing cement:
 - .1 Hydraulic setting on mineral wool, to ASTM C449/C449M.

2.5 VAPOUR RETARDER LAP ADHESIVE

- .1 Water based, fire retardant type, compatible with insulation.

2.6 INDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.

2.7 OUTDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.
- .2 Reinforcing fabric: fibrous glass, untreated 305 g/m².

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.
- .2 Surfaces 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 this specification.
- .3 Use two (2) layers with staggered joints when required nominal wall thickness exceeds 75mm.
- .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 compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.4 INSTALLATION OF ELASTOMERIC INSULATION

- .1 Insulation to remain dry. Overlaps in accordance with manufacturer’s instructions.
- .2 Provide vapour retarder in accordance with manufacturer’s instructions.

3.5 PIPING INSULATION SCHEDULES

- .1 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .2 TIAC Code: A-6.
 - .1 Insulation securements: per manufacturer recommendations.
 - .2 Seals: lap seal adhesive, lagging adhesive.
 - .3 Installation: in accordance with TIAC requirements and manufacturer’s recommendations.
- .3 Thickness of insulation as listed in following table.
 - .1 Run-outs to individual units and equipment not exceeding 4m long.
 - .2 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.

Application	TIAC code	Pipe sizes (NPS) and insulation thickness (mm)					
		Run out	to 1	1 1/4 to 2	2 1/2 to 4	5 to 6	8 & over
Refrigerant Piping	A-6	25	25	25	25	25	25
Cooling Unit / Cooling Coil Condensate	A-6	25	25	25	25	25	25

.4 Finishes:

- .1 Exposed Indoors: PVC jacket.
- .2 Exposed Indoors, Mechanical Rooms: canvas jacket.
- .3 Concealed, Indoors: canvas jacket.
- .4 Outdoors: water-proof aluminum jacket.
- .5 Use vapour retarder jacket on TIAC code A-3 insulation compatible with insulation.
- .6 Finish attachments: stainless steel bands, at 150 mm on centre. Seals: wing closed.
- .7 Installation: to appropriate TIAC code CRF/1 through CPF/5.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 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 REFERENCES

- .1 American National Standards Institute/National Fire Prevention Association (ANSI/NFPA)
 - .1 ANSI/NFPA 13-[02], Installation of Sprinkler Systems.
 - .2 ANSI/NFPA 24-[02], Installation of Private Fire Service Mains and Their Appurtenances.
 - .3 ANSI/NFPA 25-[02], Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN4 S543-[M984], Standard for Internal Lug Quick Connect Couplings for Fire Hose.

1.2 SAMPLES

- .1 Submit samples of following:
 - .1 Each type of sprinkler head.

1.3 DESIGN REQUIREMENTS

- .1 Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use.
- .2 Design and provide each system to give full consideration to blind spaces, piping, electrical equipment, ducts, and other construction and equipment in accordance with detailed shop drawings.
- .3 Locate sprinkler heads in consistent pattern with ceiling grid, lights, and air supply diffusers.
- .4 Devices and equipment for fire protection service: ULC approved for use in wet pipe sprinkler systems.
- .5 Design systems for earthquake protection for buildings in seismic zones for Ottawa as outlined in the Ontario Building Code.
- .6 Location of Sprinkler Heads:
 - .1 Locate heads in relation to ceiling and spacing of sprinkler heads not to exceed that permitted by NFPA 13 for ordinary occupancy.
 - .2 Uniformly space sprinklers on branch.

1.4 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 10 00 – General Instructions.
- .2 Shop Drawings:
 - .1 Submit shop drawings in accordance with Section 01 10 00 – General Instructions.
- .3 Quality assurance submittals: submit following in accordance with Section 01 10 00 – General Instructions.
 - .1 Test reports:
 - .1 Submit certified test reports for wet pipe fire protection sprinkler systems from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .3 Instructions: submit manufacturer's installation instructions.
 - .2 Manufacturer's Field Reports: manufacturer's field reports specified.
- .4 Closeout Submittals:
 - .1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 10 00 – General Instructions in accordance with ANSI/NFPA 20.
 - .2 Manufacturer's Catalog Data, including specific model, type, and size for:
 - .1 Pipe and fittings.
 - .2 Sprinkler heads.
 - .3 Pipe hangers and supports.
 - .3 Drawings:
 - .1 Sprinkler heads and piping system layout.
 - .1 Prepare 760mm by 1050mm detail working drawings of system layout in accordance with NFPA 13, "Working Drawings (Plans)".
 - .2 Show data essential for proper installation of each system.
 - .3 Show details, plan view, elevations, and sections of systems supply and piping.
 - .4 Show piping schematic of systems supply, devices, valves, pipe, and fittings. Show point to point electrical wiring diagrams.
 - .2 Electrical wiring diagrams.
 - .4 Field Test Reports:
 - .1 Preliminary tests on piping system.

- .5 Records:
 - .1 As-built drawings of each system.
 - .1 After completion, but before final acceptance, submit complete set of as-built drawings of each system for record purposes.
 - .2 Submit 760mm by 1050mm drawings with title block similar to full size contract drawings.
- .6 Operation and Maintenance Manuals:
 - .1 Provide maintenance data for incorporation into manual specified in Section 01 10 00 – General Instructions.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in wet sprinkler systems with documented experience.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 10 00 – General Instructions.
 - .2 Provide spare sprinklers and tools as required by ANSI/NFPA 13.

1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 10 00 – General Instructions.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Protection:
 - .1 Store materials indoors, in dry location.
 - .2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
- .3 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

Part 2 Products

2.1 ABOVE GROUND PIPING SYSTEMS

- .1 Provide fittings for changes in direction of piping and for connections.
 - .1 Make changes in piping sizes through tapered reducing pipe fittings, bushings will not be permitted.
- .2 Perform welding in shop; field welding will not be permitted.
- .3 Conceal piping in areas with suspended ceiling.

2.2 PIPE, FITTINGS AND VALVES

- .1 Pipe:
 - .1 Ferrous: to ANSI/NFPA 13.
 - .2 Copper tube: to ANSI/NFPA 13.
- .2 Fittings and joints to ANSI/NFPA 13:
 - .1 Ferrous: screwed, welded, flanged or roll grooved.
 - .2 Copper tube: screwed, soldered, brazed.
 - .3 Provide threaded or grooved-end type fittings into which sprinkler heads, sprinkler head riser nipples, or drop nipples are threaded.
 - .4 Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into pipe when pressure is applied will not be permitted.
 - .5 Rubber gasketed grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 32mm (1-1/4") and larger.
 - .6 Fittings: ULC approved for use in wet pipe sprinkler systems.
 - .7 Ensure fittings, mechanical couplings, and rubber gaskets are supplied by same manufacturer.
 - .8 Side outlet tees using rubber gasketed fittings are not permitted.
 - .9 Sprinkler pipe and fittings: metal.
- .3 Valves:
 - .1 ULC listed for fire protection service.
 - .2 Gate valves: open by counter-clockwise rotation.
 - .3 Provide rising stem OS & Y valve beneath each alarm valve in each riser when more than one alarm valve is supplied from same water supply pipe.
 - .4 Check valves: flanged clear opening swing-check type with flanged inspection and access cover plate for sizes 10cm and larger.
 - .5 Provide gate valve in piping protecting elevator hoistways, machine rooms, and machinery spaces.
- .4 Pipe hangers:
 - .1 ULC listed for fire protection services in accordance with NFPA.

2.3 SPRINKLER HEADS

- .1 General: to ANSI/NFPA 13 and ULC listed for fire services.
- .2 Sprinkler Head Type:
 - .1 Type A: pendant chrome glass bulb type.
 - .1 For installation in all areas with suspended ceilings.
 - .2 Type B: upright bronze type complete with sprinkler guard.
 - .1 For installation in all areas with exposed ceiling (ie. storage areas, workshop, etc.).
- .3 Provide sprinkler heads with orifice sized to match existing.
 - .1 Release element of each head to be of intermediate temperature rating or higher as suitable for specific application, and match existing sprinkler head ratings.
 - .2 Provide polished chromium-plated pendent sprinklers below suspended ceilings.
 - .3 Provide corrosion-resistant sprinkler heads and sprinkler head guards in accordance with NFPA 13.
 - .4 Provide sprinkler heads as indicated.
 - .5 Deflector: not more than 75mm below suspended ceilings.
 - .6 Ceiling plates: not more than 25mm deep.
 - .7 Ceiling cups: not permitted.

2.4 PIPE SLEEVES

- .1 Provide pipe sleeves where piping passes through walls, floors, and roofs.
- .2 Secure sleeves in position and location during construction.
- .3 Provide sleeves of sufficient length to pass through entire thickness of walls, floors, and roofs.
- .4 Provide 2.5cm minimum clearance between exterior of piping and interior of sleeve or core-drilled hole.
 - .1 Firmly pack space with mineral wool insulation.
 - .2 Seal space at both ends of sleeve or core-drilled hole with mechanically adjustable segmented elastomeric seal.
 - .3 In fire walls and fire floors, seal both ends of pipe sleeves or core-drilled holes with ULC listed fill, void, or cavity material.
- .5 Sleeves in Masonry and Concrete Walls, Floors, and Roofs:
 - .1 Provide hot-dip galvanized steel sleeves.
 - .2 Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in core-drilled hole are completely grouted smooth.
- .6 Sleeves in materials other than masonry and concrete walls, floors and roofs:
 - .1 Provide 0.61mm thick galvanized steel sheet.

2.5 ESCUTCHEON PLATES

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

2.6 SPARE PARTS CABINET

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

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

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

3.3 PIPE INSTALLATION

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

3.4 DISINFECTION

- .1 Disinfect new piping.
- .2 Fill piping systems with solution containing minimum of 50 parts per million of chlorine and allow solution to stand for minimum of 24h.
- .3 Flush solution from systems with clean water until maximum residual chlorine content is not greater than 0.2 parts per million or residual chlorine content of domestic water supply.

- .4 Obtain at least two (2) consecutive satisfactory bacteriological samples from piping, analyzed by certified laboratory, and submit results prior to piping being placed into service.

3.5 **FIELD PAINTING**

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

3.6 **FIELD QUALITY CONTROL**

- .1 Site Test, Inspection:
 - .1 Perform test to determine compliance with specified requirements in presence of Departmental Representative.
 - .2 Test, inspect, and approve piping before covering or concealing.
 - .3 Preliminary Tests:
 - .1 Hydrostatically test each system at 200 psig for a 2h period with no leakage or reduction in pressure.
 - .2 Flush piping with potable water in accordance with NFPA 13.

- .3 Piping above suspended ceilings: tested, inspected, and approved before installation of ceilings.
- .4 Test alarms and other devices.
- .5 Test water flow alarms by flowing water through inspector's test connection. When tests have been completed and corrections made, submit signed and dated certificate in accordance with NFPA 13.
- .4 Formal Tests and Inspections:
 - .1 Do not submit request for formal test and inspection until preliminary test and corrections are completed and approved.
 - .2 Submit written request for formal inspection at least 15 days prior to inspection date.
 - .3 Repeat required tests as directed.
 - .4 Correct defects and make additional tests until systems comply with contract requirements.
 - .5 Furnish appliances, equipment, instruments, connecting devices, and personnel for tests.
- .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.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 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 SUBMITTALS

- .1 Submittals: in accordance with Section 01 10 00 – General Instructions.
- .2 Shop drawings; submit drawings stamped and signed by Contractor registered or licensed in Province of Ontario, Canada.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .4 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.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 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 one (1) draft copy of 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 one (1) set of reproducible mechanical drawings. Provide sets of 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 MAINTENANCE

- .1 Furnish spare parts in accordance with Section 01 10 00 – General Instructions as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers.
- .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

- .1 Do painting in accordance with generally accepted industry best practices.
- .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.

3.3 FIELD QUALITY CONTROL

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

3.4 DEMONSTRATION

- .1 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.
- .2 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .3 Instruction duration time requirements as specified in appropriate sections.

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- .4 Departmental Representative may record these demonstrations on video tape for future reference.

3.5 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General

1.1 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.
- .4 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-[A2005], Adhesive and Sealant Applications.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 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.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 10 00 – General Instructions.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse and return or recycling of pallets, crates, padding and packaging materials in accordance with Section 01 10 00 – General Instructions.

Part 2 Products

2.1 COPPER TUBE AND FITTINGS

- .1 Above ground sanitary 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: to ASTM B32.

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 National Plumbing Code and local authority having jurisdiction.

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, condensate, pump discharge etc.) complete with directional arrows every floor or 4.5m (whichever is less).

3.5 CLEANING

- .1 Clean in accordance with Section 01 10 00 – General Instructions.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 10 00 – General Instructions.
- .2 Shop drawings; submit drawings stamped and signed by Contractor registered or licensed in Province of Ontario, Canada.
- .3 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .4 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.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 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.

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- .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 one (1) draft copy of the 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 one (1) set of reproducible mechanical drawings. Provide sets of 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 MAINTENANCE

- .1 Furnish spare parts in accordance as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One head gasket set for each heat exchanger.
 - .4 One glass for each gauge glass.
 - .5 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers.
- .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 PAINTING REPAIRS AND RESTORATION

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

3.4 DEMONSTRATION

- .1 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.
- .2 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .3 Instruction duration time requirements as specified in appropriate sections.
- .4 Departmental Representative may record these demonstrations on video tape for future reference.

3.5 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 10 00 – General Instructions.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with manufacturer's recommendations.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials in accordance with Section 01 10 00 – General Instructions.

Part 2 Products

2.1 NOT USED

- .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.
- .4 Provide flexible connectors complete with all accessories for air handling units, heat exchangers, pumps, chillers, cooling towers, etc.

3.3 CLEARANCES

- .1 Provide clearance around systems, equipment and components for observation of operation, inspection, servicing, maintenance and as recommended by manufacturer.
- .2 Provide space for disassembly, removal of equipment and components as recommended by manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment, and 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 ½ or ¾ gate or globe valves unless indicated otherwise, with hose end male thread, cap and chain.
- .5 Drawings do not show all valves. Contractor shall be responsible to provide all drain valves required.

3.5 DIELECTRIC COUPLINGS, UNIONS & FLANGE KITS

- .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 NPS 2 & Over: isolating flange kits to suit temperature, pressure and working fluid.

3.6 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 Pipe routing on drawings is only indicative and does not show all valves, fittings supports and accessories. Contractor shall verify site conditions prior to commencement of work, and allow for all required piping accessories and supports.
- .5 Assemble piping using fittings manufactured to ANSI standards.
- .6 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.
- .7 Install exposed piping, equipment, rectangular cleanouts and similar items parallel or perpendicular to building lines.
- .8 Install concealed pipework to minimize furring space, maximize headroom, conserve space.
- .9 Slope piping, except where indicated, in direction of flow for positive drainage and venting.
- .10 Install, except where indicated, to permit separate thermal insulation of each pipe.

- .11 Group piping wherever possible.
- .12 Ream pipes, remove scale and other foreign material before assembly.
- .13 Use eccentric reducers at pipe size changes to ensure positive drainage and venting.
- .14 Provide for thermal expansion as indicated.
- .15 Valves:
 - .1 Install in accessible locations.
 - .2 Remove interior parts before soldering.
 - .3 Install with stems above horizontal position unless otherwise indicated.
 - .4 Valves accessible for maintenance without removing adjacent piping.
 - .5 Install globe valves in bypass around control valves.
 - .6 Use ball valves at branch take-offs for isolating purposes except where otherwise specified.
 - .7 Use chain operators on valves NPS 2-1/2 and larger where installed more than 2400mm (95 inches) above floor in Mechanical Rooms.
- .16 Check Valves:
 - .1 Install silent check valves on discharge of pumps and 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.
- .17 Provide flexible connectors complete with accessories on all equipment.

3.7 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: 6mm (1/4 inch) 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 25mm (1 inch) 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.

3.8 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.

3.9 PREPARATION FOR FIRESTOPPING

- .1 Material and installation within annular space between pipes, ducts, insulation and adjacent fire separation to be fire stopped.
- .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 firestopping material or installation.
- .4 Insulated pipes and ducts: ensure integrity of insulation and vapour barriers.

3.10 FLUSHING OUT OF PIPING SYSTEMS

- .1 Flush system in accordance with Section 23 08 02 - Cleaning and Start-up of Mechanical Piping Systems.
- .2 Before start-up, clean interior of piping systems in accordance with requirements of Section 01 10 00 – General Instructions supplemented as specified in relevant mechanical sections.
- .3 Preparatory to acceptance, clean and refurbish equipment and leave in operating condition, including replacement of filters in piping systems.

3.11 PRESSURE TESTING OF EQUIPMENT AND PIPEWORK

- .1 Advise Departmental Representative 48h minimum prior to performance of pressure tests.
- .2 Pipework: test as specified in relevant sections of mechanical specification.
- .3 Maintain specified test pressure without loss for 4h 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.

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- .5 Conduct tests in presence of Departmental Representative.
 - .6 Pay costs for repairs or replacement, retesting, and making good. Departmental Representative to determine whether repair or replacement is appropriate.
 - .7 Insulate or conceal work only after approval and certification of tests by Departmental Representative.

3.12 EXISTING SYSTEMS

- .1 Connect into existing piping systems at times approved by Departmental Representative.
- .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.

3.13 CLEANING

- .1 Clean in accordance with Section 01 10 00 – General Instructions. Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1-[04], Power Piping.
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM A125-[1996(R2001)], Specification for Steel Springs, Helical, Heat-Treated.
 - .2 ASTM A307-[04], Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A563-[04a], Specification for Carbon and Alloy Steel Nuts.
- .3 Factory Mutual (FM).
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
 - .1 MSS SP58-[02], Pipe Hangers and Supports - Materials, Design and Manufacture.
 - .2 ANSI/MSS SP69-[03], Pipe Hangers and Supports - Selection and Application.
 - .3 MSS SP89-[03], Pipe Hangers and Supports - Fabrication and Installation Practices.
- .6 Underwriter's Laboratories of Canada (ULC).

1.2 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:
 - .1 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.
 - .3 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.
 - .4 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment in accordance with MSS SP58.
 - .5 Provide all other bases, hangers and supports as per manufacturer's requirements.

- .2 Performance Requirements:
 - .1 Design supports, platforms, catwalks and hangers to withstand seismic events as specified in the Ontario Building Code for geographic region.

1.3 SUBMITTALS

- .1 Submittals: in accordance with specification Section 01 10 00 – General Instructions.
- .2 Shop drawings: submit drawings stamped and signed by Contractor registered or licensed in the Province of Ontario, Canada.
- .3 Submit shop drawings and product data for the following items:
 - .1 Bases, hangers and supports.
 - .2 Connection to equipment and structure.
 - .3 Structural assemblies.
- .4 Closeout Submittals:
 - .1 Provide maintenance data for incorporation into manual specified in specification Section 01 10 00 – General Instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

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 after manufacture.
 - .2 Use electro-plating galvanizing process or hot dipped galvanizing process.
 - .3 Ensure steel hangers in contact with copper piping are 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 and FM approved 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 and FM approved 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 and FM approved.
- .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 6mm (1/4") minimum greater than rod diameter.
 - .2 Concrete inserts: wedge shaped body with knockout protector plate UL listed and FM approved to MSS SP69.
- .5 Shop and field-fabricated assemblies:
 - .1 Trapeze hanger assemblies: to MSS SP89.
 - .2 Steel brackets: to MSS SP89.
 - .3 Sway braces for seismic restraint: in accordance with Ontario Building Code and Section 23 05 48 – Vibration and Seismic Control for HVAC Piping and Equipment.
- .6 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.
 - .3 Do not use 22mm (3/4") rod.
- .7 Pipe attachments: material to MSS SP58:
 - .1 Attachments for steel piping: carbon steel black.
 - .2 Attachments for copper piping: copper plated black steel.
 - .3 Use insulation protection saddles for hot pipework.
 - .4 Oversize pipe hangers and supports.
- .8 Adjustable clevis: material to MSS SP69 UL listed and FM approved, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
 - .1 Ensure "U" has hole in bottom for rivetting to insulation shields.
- .9 Yoke style pipe roll: carbon steel yoke, rod and nuts with cast iron roll, to MSS SP69.

- .10 U-bolts: carbon steel to MSS SP69 with 2 nuts at each end to ASTM A563.
 - .1 Finishes for steel pipework: black.
 - .2 Finishes for copper, glass, brass or aluminum pipework: black], with formed portion epoxy coated.
- .11 Pipe rollers: cast iron roll and roll stand with carbon steel rod to MSS SP69. Shop and field fabricated assemblies:
 - .1 Trapeze Hanger Assemblies: to MSS SP-89.
 - .2 Steel Brackets: to MSS SP-89.
 - .3 Sway Braces for Seismic Restraint Systems: to MSS SP-89.

2.3 RISER CLAMPS

- .1 Steel or cast iron pipe: black carbon steel to MSS SP58, type 42, UL listed and FM approved.
- .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/m³ density insulation plus insulation protection shield to: MSS SP69, galvanized sheet carbon steel. Length designed for maximum 3m span.
- .2 Insulated hot piping:
 - .1 Curved plate 300mm long, with edges turned up, for pipe sizes NPS 2-1/2 and over, carbon steel to comply with MSS SP69.
 - .2 Curved plate 300mm 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 25mm 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: 13mm minimum, 50mm maximum, use single spring pre-compressed variable spring hangers.
- .2 Vertical movement greater than 50mm: 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. 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 13mm 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, Provincial Code and authority having jurisdiction.
- .2 Fire protection: to applicable fire code.
- .3 Gas and fuel oil piping: up to NPS 1/2: every 1.8 m.
- .4 Copper piping: up to NPS 1/2: every 1.5 m.
- .5 Flexible joint roll groove pipe: in accordance with table below, but not less than one hanger at joints.
- .6 Within 300mm of each elbow.

Maximum Pipe Size : NPS	Maximum Spacing Steel	Maximum Spacing Copper
up to 1-1/4	2.1 m	1.8 m
1-1/2	2.7 m	2.4 m
2	3.0 m	2.7 m
2-1/2	3.6 m	3.0 m
3	3.6 m	3.0 m
3-1/2	3.9 m	3.3 m
4	4.2 m	3.6 m
5	4.8 m	
6	5.1 m	
8	5.7 m	
10	6.6 m	
12	6.9 m	

- .7 Pipe work greater than NPS 12: to MSS SP69.

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.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Gas Association (CGA)
 - .1 CSA/CGA B149.1-[05], Natural Gas and Propane Installation Code.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.60-[97], Interior Alkyd Gloss Enamel.
 - .2 CAN/CGSB-24.3-[92], Identification of Piping Systems.
- .3 National Fire Protection Association (NFPA)
 - .1 NFPA 13-[2002], Standard for the Installation of Sprinkler Systems.
 - .2 NFPA 14-[2003], Standard for the Installation of Standpipe and Hose Systems.

1.2 SUBMITTALS

- .1 Product Data:
- .2 Submittals: in accordance with Section 01 10 00 – General Instructions.
- .3 Product data to include paint colour chips, other products specified in this section.
- .4 Samples:
 - .1 Submit samples in accordance with Section 01 10 00 – General Instructions
 - .2 Samples to include nameplates, labels, tags, lists of proposed legends.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 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: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.
 - .2 Dispose of unused paint and coating material at official hazardous material collections site.
 - .3 Do not dispose of unused paint and coating material into sewer system, into streams, lakes, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

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

2.2 SYSTEM NAMEPLATES

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

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

- .2 Use maximum of 25 letters/numbers per line.
- .4 Locations:
 - .1 Terminal cabinets, control panels: use size #5.
 - .2 Equipment in Mechanical Rooms: use size #9.

- .5 Identification for PWGSC Preventive Maintenance Support System (PMSS):
 - .1 Use arrangement of Main identifier, Source identifier, Destination identifier.
 - .2 Equipment in Mechanical Room:
 - .1 Main identifier: size #9.
 - .2 Source and Destination identifiers: size #6.
 - .3 Terminal cabinets, control panels: size #5.
 - .3 Equipment elsewhere: sizes as appropriate.

2.3 EXISTING IDENTIFICATION SYSTEMS

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

2.4 PIPING SYSTEMS GOVERNED BY CODES

- .1 Identification:
 - .1 Sprinklers: to NFPA 13.
 - .2 Standpipe and hose systems: to NFPA 14.

2.5 IDENTIFICATION OF PIPING SYSTEMS

- .1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.
- .2 Pictograms:
 - .1 Where required: Workplace Hazardous Materials Information System (WHMIS) regulations.
- .3 Legend:
 - .1 Block capitals to sizes and colours listed in CAN/CGSB 24.3.
- .4 Arrows showing direction of flow:
 - .1 Outside diameter of pipe or insulation less than 75mm: 100mm long x 50mm high.
 - .2 Outside diameter of pipe or insulation 75mm and greater: 150mm long x 50mm 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 20mm and smaller: waterproof and heat-resistant pressure sensitive plastic marker tags.
 - .2 Other pipes: pressure sensitive vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150 degrees C and intermittent temperature of 200 degrees C.

.7 Colours and Legends:

- .1 Where not listed, obtain direction from Departmental Representative.
- .2 Colours for legends, arrows: to following table:

Background Colour	Legend, Arrows
Yellow	Black
Green	White
Red	White

- .3 Background colour marking and legends for piping systems:

** Add design temperature
++ Add design temperature and pressure

Contents	Background Colour Markings	Legend
Refrigeration Liquid	Yellow	REF. LIQUID
Refrigeration Hot Gas	Yellow	REF. HOT GAS
Sanitary Drain	Green	SAN
Sprinklers	Red	SPRINKLERS
Fire Protection Water	Red	FIRE PROTECTION WATER

2.6 IDENTIFICATION DUCTWORK SYSTEMS

- .1 50mm high stencilled letters and directional arrows 150mm long x 50mm high.
- .2 Colours: back, or co-ordinated with base colour to ensure strong contrast.

2.7 VALVES, CONTROLLERS

- .1 Brass tags with 12mm stamped identification data filled with black paint.
- .2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.

2.8 CONTROLS COMPONENTS IDENTIFICATION

- .1 Identify all systems, equipment, components, controls, sensors with system nameplates specified in this section.
- .2 Inscriptions to include function and (where appropriate) fail-safe position.

2.9 LANGUAGE

- .1 Identification in English and French.
- .2 Use one nameplate and label for both languages.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 TIMING

- .1 Provide identification only after any required painting has been completed.

3.3 INSTALLATION

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

3.4 NAMEPLATES

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

3.5 LOCATION OF IDENTIFICATION ON PIPING AND DUCTWORK SYSTEMS

- .1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels: at not more than 17m intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
- .2 Adjacent to each change in direction.
- .3 At least once in each small room through which piping or ductwork passes.
- .4 On both sides of visual obstruction or where run is difficult to follow.
- .5 On both sides of separations such as walls, floors, partitions.

- .6 Where system is installed in pipe chases, ceiling spaces, galleries, confined spaces, at entry and exit points, and at access openings.
- .7 At beginning and end points of each run and at each piece of equipment in run.
- .8 At point immediately upstream of major manually operated or automatically controlled valves, and dampers. Where this is not possible, place identification as close as possible, preferably on upstream side.
- .9 Identification easily and accurately readable from usual operating areas and from access points.
 - .1 Position of identification approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.6 VALVES, CONTROLLERS

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

3.7 CLEANING

- .1 Proceed in accordance with Section 01 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 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.
- .2 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this section.

1.2 QUALIFICATIONS OF TAB PERSONNEL

- .1 Submit names of personnel to perform TAB to Departmental Representative within 15 days of award of contract.
- .2 Provide documentation confirming qualifications, successful experience.
- .3 TAB: performed in accordance with the requirements of standard under which TAB Firm's qualifications are approved:
 - .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1-[2002].
 - .2 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems-[1998].
 - .3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing-[2002].
- .4 Recommendations and suggested practices contained in the TAB Standard: mandatory.
- .5 Use TAB Standard provisions, including checklists, and report forms to satisfy Contract requirements.
- .6 Use TAB Standard for TAB, including qualifications for TAB Firm and Specialist and calibration of TAB instruments.
- .7 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.
- .8 TAB Standard quality assurance provisions such as performance guarantees form part of this contract.
 - .1 For systems or system components not covered in TAB Standard, use TAB procedures developed by TAB Specialist.
 - .2 Where new procedures, and requirements, are applicable to Contract requirements have been published or adopted by body responsible for TAB Standard used (AABC, NEBB, or TABB), requirements and recommendations contained in these procedures and requirements are mandatory.

1.3 PURPOSE OF TAB

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads
- .2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.
- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.

1.4 EXCEPTIONS

- .1 TAB of systems and equipment regulated by codes, standards to satisfaction of authority having jurisdiction.

1.5 CO-ORDINATION

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.
- .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.

1.6 PRE-TAB REVIEW

- .1 Review contract documents before project construction is started and confirm in writing to Departmental Representative adequacy of provisions for TAB and other aspects of design and installation pertinent to success of TAB.
- .2 Review specified standards and report to Departmental Representative in writing proposed procedures which vary from standard.
- .3 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.

1.7 START-UP

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in Division 23.

1.8 OPERATION OF SYSTEMS DURING TAB

- .1 Operate systems for length of time required for TAB and as required by Departmental Representative for verification of TAB reports.

1.9 START OF TAB

- .1 Notify Departmental Representative seven (7) days prior to start of TAB.
- .2 Start TAB when building is essentially completed, including:
- .3 Installation of ceilings, doors, windows, other construction affecting TAB.
- .4 Application of weatherstripping, sealing, and caulking.
- .5 Pressure, leakage, other tests specified elsewhere Division 23.
- .6 Provisions for TAB installed and operational.
- .7 Start-up, verification for proper, normal and safe operation of mechanical and associated electrical and control systems affecting TAB including but not limited to:
 - .1 Proper thermal overload protection in place for electrical equipment.
 - .2 Air systems:
 - .1 Filters in place, clean.
 - .2 Duct systems clean.
 - .3 Ducts, air shafts, ceiling plenums are airtight to within specified tolerances.
 - .4 Correct fan rotation.
 - .5 Fire, smoke, volume control dampers installed and open.
 - .6 Coil fins combed, clean.
 - .7 Access doors, installed, closed.
 - .8 Outlets installed, volume control dampers open.

1.10 APPLICATION TOLERANCES

- .1 Do TAB to following tolerances of design values:
 - .1 HVAC systems: plus 5%, minus 5%.

1.11 ACCURACY TOLERANCES

- .1 Measured values accurate to within plus or minus 2% of actual values.

1.12 INSTRUMENTS

- .1 Prior to TAB, submit to Departmental Representative list of instruments used together with serial numbers.
- .2 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .3 Calibrate within three (3) months of TAB. Provide certificate of calibration to Departmental Representative.

1.13 SUBMITTALS

- .1 Submit, prior to commencement of TAB:
- .2 Proposed methodology and procedures for performing TAB if different from referenced standard.

1.14 PRELIMINARY TAB REPORT

- .1 Submit for checking and approval of Departmental Representative, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
 - .1 Details of instruments used.
 - .2 Details of TAB procedures employed.
 - .3 Calculations procedures.
 - .4 Summaries.

1.15 TAB REPORT

- .1 Format in accordance with referenced standards.
- .2 TAB report to show results in SI units and to include:
 - .1 Project record drawings.
 - .2 System schematics.
- .3 Submit one (1) electronic and three (3) printed copies of TAB Report to Departmental Representative for verification and approval, in English.

1.16 VERIFICATION

- .1 Reported results subject to verification by Departmental Representative.
- .2 Provide personnel and instrumentation to verify up to 30% of reported results.
- .3 Number and location of verified results as directed by Departmental Representative.
- .4 Pay costs to repeat TAB as required to satisfaction of Departmental Representative.

1.17 SETTINGS

- .1 After TAB is completed to satisfaction of Departmental Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.
- .2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

1.18 COMPLETION OF TAB

- .1 TAB considered complete when final TAB Report received and approved by Departmental Representative.

1.19 AIR SYSTEMS

- .1 Standard: TAB to most stringent of TAB standards of AABC, NEBB, SMACNA or ASHRAE.
- .2 Do TAB of systems, equipment, components, controls specified Division 23. Systems, equipment, components, controls as follows:
 - .1 Supply and return air systems serving room 1028.
- .3 Qualifications: personnel performing TAB current member in good standing of AABC or NEBB and qualified to standards of AABC or NEBB.
- .4 Quality assurance: perform TAB under direction of supervisor qualified to standards of AABC or NEBB.
- .5 Measurements: to include as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise, vibration.
- .6 Locations of equipment measurements: to include as appropriate:
 - .1 Inlet and outlet of dampers, filter, coil, humidifier, fan, other equipment causing changes in conditions.
 - .2 At controllers, controlled device.
- .7 Locations of systems measurements to include as appropriate: main ducts, main branch, sub-branch, run-out (or grille, register or diffuser).

1.20 POST-OCCUPANCY TAB

- .1 Measure DBT, WBT (or %RH), air velocity, air flow patterns, NC levels, in occupied zone of following areas: Flexible Cabin Laboratory (FCL).

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 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 Thermal Insulation Association of Canada (TIAC): National Insulation Standards (2005).
- .5 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.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 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 Shop Drawings:
 - .1 Provide drawings stamped and signed Contractor registered or licensed in Province of Ontario, Canada.
- .4 Samples:
 - .1 Submit for approval: complete assembly of each type of insulation system, insulation, coating, and adhesive proposed.
 - .2 Mount sample on 12mm plywood board.
 - .3 Affix typewritten label beneath sample indicating service.
- .5 Manufacturer's Instructions:
 - .1 Provide manufacturer's written duct insulation jointing recommendations. and special handling criteria, installation sequence, and cleaning procedures.

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: specialist in performing work of this section, and have at least three (3) years successful experience in this size and type of project, qualified to standards and member of TIAC in good standing.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 10 00 – General Instructions.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address and ULC markings.
- .3 Packaging Waste Management: remove for reuse and return to manufacturer of pallets, crates, padding and packaging materials.

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 or 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 or 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 Canvas:
 - .1 220gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
- .2 Lagging adhesive: compatible with insulation.
 - .1 Maximum VOC limit 200g/L to SCAQMD Rule 1168.

2.4 ACCESSORIES

- .1 Vapour retarder lap adhesive:
 - .1 Water based, fire retardant type, compatible with insulation.
 - .1 Maximum VOC limit 200g/L to SCAQMD Rule 1168.

- .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 ULC Listed Canvas Jacket:
 - .1 220gm/m² cotton, plain weave, treated with dilute fire retardant lagging adhesive to ASTM C921.
- .5 Outdoor Vapour Retarder Mastic:
 - .1 Vinyl emulsion type acrylic, compatible with insulation.
 - .2 Reinforcing fabric: Fibrous glass, untreated 305g/m².
- .6 Tape: self-adhesive, aluminum, reinforced, 50mm wide minimum.
- .7 Contact adhesive: quick-setting
 - .1 Maximum VOC limit 200g/L to SCAQMD Rule 1168.
- .8 Canvas adhesive: washable.
 - .1 Maximum VOC limit 200g/L to SCAQMD Rule 1168.
- .9 Tie wire: 1.5mm stainless steel.
- .10 Banding: 12mm wide, 0.5mm thick stainless steel.
- .11 Facing: 25mm stainless steel hexagonal wire mesh stitched on one face of insulation with expanded metal lath on other face.
- .12 Fasteners: 4mm diameter pins with 35mm 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 two (2) layers with staggered joints when required nominal thickness exceeds 75mm.

- .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 300mm on centre in horizontal and vertical directions, minimum two (2) rows each side.
- .7 Fasteners: install at 300mm 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 supply air ducts	C-1	yes	25
Round supply air ducts	C-2	yes	25

- .2 Exposed round ducts 600mm 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 01 10 00 – General Instructions.
 - .1 Remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

1.2 SUBMITTALS

- .1 Submittals in accordance with Section 00 10 0 – General Instructions.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet for piping, fittings and equipment.
 - .2 Submit WHMIS MSDS in accordance with Section 01 10 00 – General Instructions. Indicate VOC's for adhesive and solvents during application and curing.
- .3 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Instructions: submit manufacturer's installation instructions.

- .6 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 10 00 – General Instructions.

1.3 QUALITY ASSURANCE

- .1 Pre-Installation Meeting:
- .1 Convene pre-installation meeting one (1) week prior to beginning on-site installations in accordance with Section 01 10 00 – General Instructions.
- .2 Health and Safety:
- .1 Do construction occupational health and safety in accordance with Section 01 10 00 – General Instructions.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard and packaging material in appropriate on-site bins for recycling.
- .4 Separate for reuse and recycling and place in designated containers steel, metal, and plastic waste in appropriate on-site bins for recycling.
- .5 Divert unused metal materials from landfill to metal recycling facility as approved by NRC Departmental Representative.

Part 2 Products

2.1 TUBING

- .1 Processed for refrigeration installations, deoxidized, dehydrated and sealed.
- .1 Hard copper: to ASTM B280, type ACR.
- .2 Annealed copper: to ASTM B280, with minimum wall thickness as per CSA B52 and ASME B31.5.

2.2 FITTINGS

- .1 Service: design pressure 2070kPa and temperature 121 degrees C.
- .2 Brazed:
- .1 Fittings: wrought copper to ASME B16.22.
- .2 Joints: silver solder, 15% Ag-80% Cu-5%P and non-corrosive flux.
- .3 Flanged:
- .1 Bronze or brass, to ASME B16.24, Class 150 and Class 300.
- .2 Gaskets: suitable for service.
- .3 Bolts, nuts and washers: to ASTM A307, heavy series.

- .4 Flared:
 - .1 Bronze or brass, for refrigeration, to ASME B16.26.

2.3 PIPE SLEEVES

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

2.4 VALVES

- .1 22mm and under: Class 500, 3.5MPa, globe or angle non-directional type, diaphragm, packless type, with forged brass body and bonnet, moisture proof seal for below freezing applications, brazed connections.
- .2 Over 22mm: Class 375, 2.5MPa, globe or angle type, diaphragm, packless type, back-seating, cap seal, with cast bronze body and bonnet, moisture proof seal for below freezing applications, brazed connections.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 GENERAL

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

3.3 BRAZING PROCEDURES

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

3.4 PIPING INSTALLATION

- .1 General:
 - .1 Hard drawn copper tubing: do not bend. Minimize use of fittings.
- .2 Hot gas lines:
 - .1 Pitch at least 1:240 down in direction of flow to prevent oil return to compressor during operation.
 - .2 Provide trap at base of risers greater than 2400mm high and at each 7600mm thereafter.
 - .3 Provide inverted deep trap at top of risers.

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

3.5 PRESSURE AND LEAK TESTING

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

3.6 FIELD QUALITY CONTROL

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

- .8 Checks:
 - .1 Make checks and measurements as per manufacturer's operation and maintenance instructions.
 - .2 Record and report measurements to NRC Departmental Representative.
- .9 Manufacturer's Field Services:
 - .1 Have manufacturer of products, supplied under this Section, review Work involved in the handling, installation/application, protection and cleaning, of its products and submit written reports, in acceptable format, to verify compliance of Work with Contract.
 - .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, at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of the Work, after cleaning is carried out.
 - .4 Obtain reports, within three (3) days of review, and submit, immediately, to NRC Departmental Representative.

3.7 DEMONSTRATION

- .1 Instructions:
 - .1 Post instructions in frame with glass cover in accordance with Section 01 10 00 – General Instructions and CSA B52.

3.8 CLEANING

- .1 Perform cleaning operations as specified in Section 01 10 00 – General Instructions and in accordance with manufacturer's recommendations.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM A480/A480M-[03c], Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet and Strip.
 - .2 ASTM A635/A635M-[02], Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Carbon, Hot Rolled.
 - .3 ASTM A653/A653M-[03], Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
- .3 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33 .
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .5 National Fire Protection Association (NFPA).
 - .1 NFPA 90A-[02], Standard for the Installation of Air-Conditioning and Ventilating Systems.
 - .2 NFPA 90B-[02], Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
 - .3 NFPA 96-[01], Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.
- .6 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
 - .1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2nd Edition [1995] and Addendum No. 1, [1997].
 - .2 SMACNA HVAC Air Duct Leakage Test Manual, [1985], 1st Edition.
 - .3 IAQ Guideline for Occupied Buildings Under Construction [1995], 1st Edition.
- .7 Transport Canada (TC).
 - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.2 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Section 01 10 00 – General Instructions.
- .2 Product Data:
 - .1 Submit manufacturer’s instructions, printed product literature and data sheets for metal ducts and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 QUALITY ASSURANCE

- .1 Certification of Ratings:
 - .1 Catalogue or published ratings shall be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Protect on site stored or installed absorptive material from moisture damage.
- .2 Store and manage hazardous materials in accordance with Section 01 10 00 – General Instructions.
- .3 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene, and corrugated cardboard packaging material in appropriate on-site bins for recycling off site by Contractor.
 - .4 Separate for reuse and recycling and place in designated containers steel, metal and plastic.
 - .5 Place materials defined as hazardous or toxic in designated containers.
 - .6 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal Regulations.
 - .7 Fold up metal and plastic banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 SEAL CLASSIFICATION

- .1 Classification as follows:

Maximum Pressure [Pa]	SMACNA Seal Class
500	C
250	C
125	C
125	Unsealed

- .2 Seal classification:
 - .1 Class A: longitudinal seams, transverse joints, duct wall penetrations and connections made airtight with sealant and tape.
 - .2 Class B: longitudinal seams, transverse joints and connections made airtight with sealant.

- .3 Class C: transverse joints and connections made air tight with gaskets, sealants or combination thereof. Longitudinal seams unsealed.
- .4 Unsealed seams and joints.

2.2 SEALANT

- .1 Sealant: oil resistant, polymer type flame resistant duct sealant. Temperature range of minus 30 degrees C to plus 93 degrees C.

2.3 TAPE

- .1 Tape: polyvinyl treated, open weave fiberglass tape, 50mm wide.

2.4 DUCT LEAKAGE

- .1 In accordance with SMACNA HVAC Air Duct Leakage Test Manual.

2.5 FITTINGS

- .1 Fabrication: to SMACNA.
- .2 Radiused elbows.
 - .1 Rectangular: centerline radius: 1.5 times width of duct.
 - .2 Round: smooth radius, centreline radius: 1.5 times diameter.
- .3 Mitred elbows, rectangular:
 - .1 To 400 mm: with single thickness turning vanes.
 - .2 Over 400 mm: with double thickness turning vanes.
- .4 Branches:
 - .1 Rectangular main and branch: with radius on branch at 1.5 times width of duct.
 - .2 Round main and branch: enter main duct at 45 degrees with conical connection.
 - .3 Provide volume control damper in branch duct near connection to main duct.
 - .4 Main duct branches: with splitter damper.
- .5 Transitions:
 - .1 Diverging: 20 degrees maximum included angle.
 - .2 Converging: 30 degrees maximum included angle.
- .6 Offsets:
 - .1 Full radiused elbows.
- .7 Obstruction deflectors: maintain full cross-sectional area.
 - .1 Maximum included angles: as for transitions.

2.6 FIRE STOPPING

- .1 Retaining angles around duct, on both sides of fire separation.
- .2 Fire stopping material and installation must not distort duct.

2.7 GALVANIZED STEEL

- .1 Lock forming quality: to ASTM A653/A653M, Z90 zinc coating.
- .2 Thickness, fabrication and reinforcement: to SMACNA.
- .3 Joints: to ASHRAE & SMACNA. Proprietary manufactured duct joint to be considered to be a Class A seal.

2.8 ALUMINUM

- .1 To ASHRAE & SMACNA. Aluminum type: 3003-H-14.
- .2 Thickness, fabrication and reinforcement: to SMACNA.
- .3 Joints: to ASHRAE & SMACNA to be continuous weld.

2.9 HANGERS AND SUPPORTS

- .1 Hangers and Supports: [in accordance with Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment.
 - .1 Strap hangers: of same material as duct but next sheet metal thickness heavier than duct.
 - .1 Maximum size duct supported by strap hanger: 500.
 - .2 Hanger configuration: to ASHRAE & SMACNA.
 - .3 Hangers: galvanized steel angle with galvanized steel rods to ASHRAE & SMACNA per the following table:

Duct Size [mm]	Angle Size [mm]	Rod Size [mm]
up to 750	25 x 25 x 3	6
751 to 1050	40 x 40 x 3	6
1051 to 1500	40 x 40 x 3	10
1501 to 2100	50 x 50 x 3	10
2101 to 2400	50 x 50 x 5	10
2401 and over	50 x 50 x 6	10

- .4 Upper hanger attachments:
 - .1 For concrete: manufactured concrete inserts.
 - .2 For steel joist: manufactured joist clamp.
 - .3 For steel beams: manufactured beam clamps.

Part 3 Execution

3.1 GENERAL

- .1 Do work in accordance with SMACNA.
- .2 Do not break continuity of insulation vapour barrier with hangers or rods.
 - .1 Insulate strap hangers 100mm beyond insulated duct. Ensure diffuser is fully seated]
- .3 Support risers in accordance with SMACNA.
- .4 Install breakaway joints in ductwork on sides of fire separation.
- .5 Install proprietary manufactured flanged duct joints in accordance with manufacturer's instructions.
- .6 Manufacture duct in lengths and diameter to accommodate installation of acoustic duct lining for all locations indicated.

3.2 HANGERS

- .1 Strap hangers: install in accordance with SMACNA.
- .2 Angle hangers: complete with locking nuts and washers.
- .3 Hanger spacing: in accordance with SMACNA as follows:

Duct Size [mm]	Spacing [mm]
to 1500	3000
1501 and over	2500

3.3 WATERTIGHT DUCT

- .1 Provide watertight duct for:
 - .1 All exterior ductwork.
- .2 Form bottom of horizontal duct without longitudinal seams.
 - .1 Weld joints of bottom and side sheets.
 - .2 Seal other joints with duct sealer.
- .3 Fit base of riser with 150mm deep drain sump and 32 mm drain connected, with deep seal trap and valve and discharging to grade.

3.4 SEALING AND TAPING

- .1 Apply sealant in accordance with SMACNA.
- .2 Bed tape in sealant and recoat with minimum of one (1) coat of sealant to manufacturer's recommendations.

3.5 LEAKAGE TESTS

- .1 In accordance with SMACNA HVAC Duct Leakage Test Manual.
- .2 Do leakage tests in sections.
- .3 Zero leakage ductwork testing shall be entire duct segment with all flanged equipment in place and blind flanges at ends of runs.
- .4 Make trial leakage tests as instructed to demonstrate workmanship.
- .5 Do not install additional ductwork until trial test has been passed.
- .6 Complete test before performance insulation or concealment work.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .2 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
 - .1 SMACNA - HVAC Duct Construction Standards - Metal and Flexible, [95].

1.2 SUBMITTALS

- .1 Submittals in accordance with Section 01 10 00 – General Instructions.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet. Indicate the following:
 - .1 Flexible connections.
 - .2 Duct access doors.
 - .3 Instrument test ports.
 - .3 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.
 - .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .5 Instructions: submit manufacturer's installation instructions.
 - .6 Manufacturer's Field Reports: manufacturer's field reports specified.
 - .7 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 10 00 – General Instructions.

1.3 QUALITY ASSURANCE

- .1 Pre-Installation Meetings:
 - .1 Convene pre-installation meeting one (1) week prior to beginning on-site installations.
 - .1 Verify project requirements.
 - .2 Review installation conditions.
 - .3 Co-ordination with other building sub-trades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling off site.
 - .4 Separate for reuse and recycling and place in designated containers steel, metal, and plastic in accordance with Section 01 10 00 – General Instructions.
 - .5 Divert unused metal materials from landfill to approved metal recycling facility.

Part 2 Products

2.1 GENERAL

- .1 Manufacture in accordance with SMACNA - HVAC Duct Construction Standards.

2.2 FLEXIBLE CONNECTIONS

- .1 Frame: galvanized sheet metal frame with fabric clenched by means of double locked seams.
- .2 Material:
 - .1 Fire resistant, self-extinguishing, neoprene coated glass fabric, temperature rated at minus 40 degrees C to plus 90 degrees C, density of 1.3kg/m².

2.3 ACCESS DOORS IN DUCTS

- .1 Non-Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6mm thick complete with sheet metal angle frame.
- .2 Insulated Ducts: sandwich construction of same material as duct, one sheet metal thickness heavier, minimum 0.6mm thick complete with sheet metal angle frame and 25 mm thick rigid glass fibre insulation.
- .3 Gaskets: neoprene.
- .4 Hardware:
 - .1 Up to 300 x 300mm: two sash locks complete with safety chain.
 - .2 301 to 450 mm: four sash locks complete with safety chain.
 - .3 451 to 1000 mm: piano hinge and minimum two sash locks.
 - .4 Doors over 1000 mm: piano hinge and two handles operable from both sides.
 - .5 Hold open devices.
 - .6 300 x 300mm glass viewing panels.

2.4 INSTRUMENT TEST

- .1 1.6mm thick steel zinc plated after manufacture.
- .2 Cam lock handles with neoprene expansion plug and handle chain.
- .3 28mm minimum inside diameter. Length to suit insulation thickness.
- .4 Neoprene mounting gasket.

2.5 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.

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 Flexible Connections:
 - .1 Install in following locations:
 - .1 Inlets and outlets to air handling units and fans.
 - .2 Inlets and outlets of exhaust and return air fans.
 - .3 As indicated.
 - .2 Length of connection: 100mm.
 - .3 Minimum distance between metal parts when system in operation: 75 mm.
 - .4 Install in accordance with recommendations of SMACNA.
 - .5 When fan is running:
 - .1 Ducting on sides of flexible connection to be in alignment.
 - .2 Ensure slack material in flexible connection.
- .2 Access Doors and Viewing Panels:
 - .1 Size:
 - .1 600 x 1200 mm for person size entry.
 - .2 900 x 900mm for servicing entry.
 - .3 450 x 450mm for viewing.
 - .4 As indicated.

- .2 Locations:
 - .1 Fire and smoke dampers.
 - .2 Control dampers.
 - .3 Devices requiring maintenance.
 - .4 Required by code.
 - .5 Reheat coils.
 - .6 Elsewhere as indicated.
- .3 Instrument Test Ports:
 - .1 General:
 - .1 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.
 - .2 Locate to permit easy manipulation of instruments.
 - .3 Install insulation port extensions as required.
 - .4 Locations:
 - .1 For traverse readings:
 - .1 Ducted inlets to roof and wall exhausters.
 - .2 Inlets and outlets of other fan systems.
 - .3 Main and sub-main ducts.
 - .4 And as indicated.
 - .2 For temperature readings:
 - .1 At outside air intakes.
 - .2 In mixed air applications in locations as approved by Departmental Representative.
 - .3 At inlet and outlet of coils and duct reheat.
 - .4 Downstream of junctions of two converging air streams of different temperatures.
 - .5 Elsewhere as indicated.
- .4 Spin-in Collars:
 - .1 General:
 - .1 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.

3.3 CLEANING

- .1 Perform cleaning operations as specified in Section 01 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 REFERENCES

- .1 Sheet Metal and Air Conditioning National Association (SMACNA)
 - .1 SMACNA HVAC Duct Construction Standards, Metal and Flexible-[1985].
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 10 00 – General Instructions. Include product characteristics, performance criteria, and limitations.
 - .1 Submit one (1) copy of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 10 00 – General Instructions.
- .2 Quality assurance submittals: submit following in accordance with Section 01 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.

1.3 QUALITY ASSURANCE

- .1 Health and Safety Requirements:
 - .1 Do construction occupational health and safety in accordance with Section 01 10 00 – General Instructions.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle in accordance with Section 01 10 00 – General Instructions.
- .2 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

Part 2 Products

2.1 GENERAL

- .1 Manufacture to SMACNA standards.

2.2 SINGLE BLADE DAMPERS

- .1 Fabricate from same material as duct, but one sheet metal thickness heavier. V-groove stiffened.
- .2 Size and configuration to recommendations of SMACNA, except maximum height 100mm.
- .3 Locking quadrant with shaft extension to accommodate insulation thickness.
- .4 Inside and outside nylon end bearings.
- .5 Channel frame of same material as adjacent duct, complete with angle stop.

2.3 MULTI-BLADED DAMPERS

- .1 Factory manufactured of material compatible with duct.
- .2 Opposed blade: configuration, metal thickness and construction to recommendations of SMACNA.
- .3 Maximum blade height: 100mm.
- .4 Bearings: self-lubricating nylon.
- .5 Linkage: shaft extension with locking quadrant.
- .6 Channel frame of same material as adjacent duct, complete with angle stop.
- .7 Maximum leakage: 4% at 250Pa.

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 where indicated.
- .2 Install in accordance with recommendations of SMACNA and in accordance with manufacturer's instructions.

- .3 Locate balancing dampers in each branch duct, for supply, return and exhaust systems.
- .4 Runouts to registers and diffusers: install single blade damper located as close as possible to main ducts.
- .5 Dampers: vibration free.
- .6 Ensure damper operators are observable and accessible.
- .7 Corrections and adjustments conducted by NRC Departmental Representative.

3.3 FIELD QUALITY CONTROL

- .1 Tests:
 - .1 Tests to cover period of not less than five (5) days and demonstrate that system is functioning as specified.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 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 REFERENCES

- .1 American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE).
- .2 Department of Justice Canada (Jus).
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .2 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .4 National Fire Protection Association (NFPA).
 - .1 NFPA 90A-[12], Standard for the Installation of Air-Conditioning and Ventilating Systems.
 - .2 NFPA 90B-[15], Standard for Installation of Warm Air Heating and Air-Conditioning Systems.
- .5 Sheet Metal and Air-Conditioning Contractors' National Association (SMACNA).
 - .1 SMACNA HVAC Duct Construction Standards - Metal and Flexible, [95] (Addendum No.1, November 1997).
 - .2 SMACNA IAQ Guideline for Occupied Buildings under Construction, 1st Edition [95].
- .6 Underwriters' Laboratories Inc. (UL).
 - .1 UL 181-[96], Standard for Factory-Made Air Ducts and Air Connectors.
- .7 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN/ULC-S110-[1986(R2001)], Fire Tests for Air Ducts.

1.2 SUBMITTALS

- .1 Make submittals in accordance with Section 01 10 00 – General Instructions.
- .2 Show Drawings: at a minimum, include information on the following items as part of the shop drawing submission for review by Departmental Representative:
 - .1 Thermal Properties.
 - .2 Friction Loss.
 - .3 Acoustical Loss.
 - .4 Leakage.
 - .5 Fire Rating.

1.3 QUALITY ASSURANCE

- .1 Certification of Ratings:
 - .1 Catalogue or published ratings to be those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to codes and standards.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Protect on site stored or installed absorptive material from moisture damage.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling. Remove from site and dispose of packaging materials at appropriate recycling facilities.
 - .2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material for recycling.
 - .3 Place materials defined as hazardous or toxic in designated containers. Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal regulations.
 - .4 Ensure emptied containers are sealed and stored safely.
 - .5 Fold up metal and plastic banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 NON-METALLIC INSULATED

- .1 General:
 - .1 Factory fabricated to CAN/ULC-181 and complies with NFPA90A & NFPA90B.
 - .2 Core material shall not support mold and mildew growth.
 - .3 Fully lined for efficient air delivery.
 - .4 Large diameter, heavy, spring steel wire helix for stability and mechanical abuse resistance.
 - .5 Acoustically rated CPE core for quiet performance. Core shall be constructed in such a manner it shall not unravel when cut.
 - .6 All components shall be self-extinguishing.
- .2 Performance Characteristics:
 - .1 Operating Pressure: 2.49kPa (10 IN WC) for 100mm through 300mm diameter.
 - .2 Operating Temperature Range: -29°C through 121°C (-20°F through 250°F)
 - .3 Velocity (maximum): 25.4 m/s (500 FPM).
 - .4 R-Value: 4.2
 - .5 Surface Burning Characteristics:
 - .1 Maximum Flame Spread: 25.
 - .2 Maximum Smoke Development: 50.

- .6 Oxygen Index Ratings:
 - .1 CPE Core: 3.13.
 - .2 Metalized Jacked: 45.7
- .7 Vapour Transmission Rating (U.S. Perm): 0.05.
- .3 Standard of Acceptance: Thermaflex M-KE, or approved equivalent.

Part 3 Execution

3.1 DUCT INSTALLATION

- .1 Install in accordance with: CAN/ULC-S110, UL-181, NFPA 90A, NFPA 90B and SMACNA.
- .2 Install as final duct branch connection to diffuser in order to assist with noise attenuation. Flexible ductwork section of each duct branch shall not exceed 3.1m (10ft).

END OF SECTION

Part 1 General

1.1 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.

1.2 SUBMITTALS

.1 Product Data:

- .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 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 01 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.

1.3 DELIVERY, STORAGE, AND HANDLING

.1 Packing, shipping, handling and unloading:

- .1 Deliver, store and handle in accordance with Section 01 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: separate waste materials for reuse and recycling in accordance with Section 01 10 00 – General Instructions.

1.4 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 10 00 – General Instructions.
 - .2 Include:
 - .1 Keys for volume control adjustment.
 - .2 Keys for air flow pattern adjustment.

Part 2 Products

2.1 GENERAL

- .1 To meet capacity, pressure drop, terminal velocity, throw, noise level, and neck velocity as indicated.
- .2 Frames:
 - .1 Full perimeter gaskets.
 - .2 Plaster frames where set into plaster or gypsum board, and as specified.
 - .3 Concealed fasteners.
- .3 Concealed manual volume control damper operators.
- .4 Colour: as directed by Departmental Representative and as indicated.

2.2 MANUFACTURED UNITS

- .1 Grilles, registers and diffusers of same generic type, products of one manufacturer.

2.3 SUPPLY DIFFUSERS

- .1 Type SDF-1:
 - .1 Size: as indicated on drawings.
 - .2 Construction: aluminum, directional modular core, perforated face diffusers consisting of louvered pattern control modules, heavy gauge backpans, and a hinged perforated face screen. Perforated face screen shall have a free area of no less than 51%. An extended inlet collar of sufficient length to accommodate connection of round flexible ductwork shall be an integral part of the frame assembly along with volume control damper.
 - .3 Mounting Type: T-bar lay-in.
 - .4 Finish: B12 white powder coat in accordance with ASTM D1654 per ASTM D610 & ASTM D714.
 - .5 Standard of Acceptance: EH Price 200/600x600/APDMC-BN/3/B12, or approved equivalent.

2.4 RETURN GRILLES

- .1 Type RGR-1:
 - .1 Size: as indicated on drawings.
 - .2 Construction: aluminum , square inlet collars, perforated air distribution face with heavy gauge backpan. Perforated face screen shall have a free area of no less than 51%.
 - .3 Mounting Type: T-bay lay-in.
 - .4 Finish: B12 white powder coat in accordance with ASTM D1654 per ASTM D610 & ASTM D714.
 - .5 Standard of Acceptance: EH Price 550x550/600x600/APDDR/3/B12 or approved equivalent.

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 flat head, stainless steel screws in countersunk holes where fastenings are visible.
- .3 Bolt grilles, registers and diffusers in place.

3.3 CLEANING

- .1 Proceed in accordance with Section 01 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 REFERENCES

- .1 Air-Conditioning and Refrigeration Institute (ARI)
 - .1 ARI 210/240-1994, Standard for Unitary Air Conditioning and Air-Source Heat Pump Equipment.
 - .2 ARI 325-98, Standard for Ground Water - Source Heat Pumps.
- .2 American National Standards Institute/Air-Conditioning and Refrigeration Institute (ANSI/ARI)
 - .1 ANSI/ARI 320-1993, Standard for Water-Source Heat Pumps.
- .3 American National Standards Institute/National Fire Protection Association (ANSI/NFPA)
 - .1 ANSI/NFPA 90A-1999, Installation of Air Conditioning and Ventilating Systems.
- .4 American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)
 - .1 ASHRAE Standard 15-2001, Safety Standard for Refrigeration Systems.
- .5 Underwriters Laboratories (UL)
 - .1 UL1995, Heating and Cooling Equipment Standard for Safety.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with Sections 01 10 00 – General Instructions.
- .2 Indicate:
 - .1 Capacities.
 - .2 ARI Ratings.
 - .3 Sound Power Levels.
 - .4 Installation instructions.
 - .5 Start-up Instructions.
 - .6 O&M, Instructions.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 10 00 – General Instructions.

1.4 WARRANTY

- .1 For Split Systems, the 12 months warranty period prescribed in subsection GC 32.1 of General Conditions "C" shall be extended to 5 years.

Part 2 Products

2.1 GENERAL

- .1 Split Systems: CSA approved and carry ARI or CSA certification seal.
- .2 Systems shall be of a variable capacity, direct expansion (DX) heat pump engineered system consisting of a single outdoor unit, and at a minimum of at least two (2) indoor units. The outdoor unit shall have a single inverted compressor connected to the multiple indoor units via a network of piping and control wiring. Each unit shall be equipped with individual control. The multi-zone system required indoor units to be piped with the outdoor unit to complete the refrigerant circuit.

2.2 PACKAGED MULTI-ZONE DX UNITS

- .1 General:
 - .1 System shall consist of air-to-air outdoor condensing unit and multiple indoor evaporators units, for use with R-410A refrigerant.
 - .2 System components shall be designed and manufactured in production facilities maintaining ISO certifications:
 - .1 ISO 9001 Quality Management Systems; and
 - .2 ISO 14001 Environmental Management Systems.
 - .3 System components shall comply with:
 - .1 UL1995 Heating and Cooling Equipment Standard for Safety; and
 - .2 Bear Electrical Testing Laboratories label (ETL).
 - .4 System components shall have electrical power wiring installed according to National Electrical Code (NEC) and all applicable local Codes and standards.
- .2 Performance Data:
 - .1 Electrical: 208 V, 1 pH, 60 Hz.
 - .2 Cooling Capacity:
 - .1 Refer to schedule on drawing 5463-M03.
- .3 Evaporators (Indoor Units) 19PAS10A, 19PAS10B & 19PAS10C:
 - .1 General:
 - .1 Unit shall be factory assembled, wired, piped and run tested.
 - .2 Unit shall be designed to be installed for indoor applications.
 - .3 Unit shall be attached to an installation plate or bracket that secures the unit to the wall.
 - .4 Depth of the unit shall not exceed 0.25m (10 inches).

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- .2 Casing:
 - .1 Unit case shall be manufactured of heavy duty Acrylonitrile Butadiene Styrene (ABS) and High Impact Polystyrene (HIPS) plastic.
 - .2 Unit case shall have a pearl white finish.
 - .3 Front face of unit shall have an architectural curved panel with white pearl finish.
 - .3 Cabinet Assembly:
 - .1 Unit shall have one (1) supply air outlet and one (1) return air inlet.
 - .2 Unit shall be equipped with factory installed temperature thermistors for:
 - .1 Return air;
 - .2 Refrigerant entering coil; and
 - .3 Refrigerant leaving coil.
 - .3 Unit shall have a built-in control panel to communicate with the outdoor unit.
 - .4 Unit shall have the following functions as standard:
 - .1 Self-diagnostic function;
 - .2 Auto re-start function;
 - .3 Auto operation function;
 - .4 Auto clean function;
 - .5 Dehumidifying function;
 - .6 Forced operation;
 - .7 Hot start; and
 - .8 Sleep mode.
 - .5 Unit shall be capable of accepting refrigerant piping routed from four (4) different directions.
 - .6 Unit shall be capable of accepting drain piping routed in two (2) different directions.
 - .4 Fan Assembly:
 - .1 Unit shall have a direct drive, cross flow fan made of high strength Acrylonitrile Butadiene Styrene (ABS) plastic.
 - .2 Fan motor shall be brushless digitally controlled (BDLC) with permanently lubricated and sealed ball bearings.
 - .3 Fan/motor assembly shall be mounted on vibration attenuating rubber grommets.
 - .4 Fan speed shall be controlled using microprocessor based on direct digitally controlled algorithm.
 - .5 In cooling mode, the indoor fan shall have the following settings:
 - .1 Low;
 - .2 Medium;
 - .3 High;
 - .4 Power Cool; and
 - .5 Auto.

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- .6 In heating mode, the indoor fan shall have the following settings:
 - .1 Low;
 - .2 Medium;
 - .3 High; and
 - .4 Auto.
 - .7 Auto fan setting shall adjust the fan speed to the most effective speed to achieve desired setpoint.
 - .8 Unit shall have factory installed motorized louver to provide flow of air in up and down direction for uniform air flow.
 - .9 Unit shall have factory installed motorized guide vane to control the direction of flow of air from side to side.
 - .5 Filter Assembly:
 - .1 Return air inlet shall have a factory supplied primary removable, washable filter.
 - .2 Unit shall be equipped with factory supplied secondary plasma filter or 3M HAF filter.
 - .3 Filter access shall be from the front of the unit.
 - .6 Coil Assembly:
 - .1 Unit shall have factory built coil comprised of aluminum fins mechanically bonded to copper tubing.
 - .2 Unit shall have a minimum 2-row coil.
 - .3 Unit shall have factory supplied condensate drain pan below coil.
 - .4 Unit shall be designed for gravity drain.
 - .5 Unit shall have a factory insulated drain hose to handle condensate.
 - .6 Unit shall have provision for 45-degree flare refrigerant pipe connections.
 - .7 Coil shall be factory pressure tested at a minimum of 551psig.
 - .8 All refrigerant piping from outdoor unit to indoor unit shall be field insulated.
 - .7 Condensate Sensor Connection:
 - .1 Unit shall include a factory installed condensate sensor connection compatible with the AquaGuard® condensate sensor.
 - .8 Microprocessor Control:
 - .1 Unit shall have a factory installed microprocessor controller capable of performing functions necessary to operate the system.
 - .2 Unit shall be able to communicate with the outdoor unit using a field supplied minimum 19AWG, 4-conductor, stranded, shielded or unshielded power/communication cable. If shielded cable is used, it must be grounded to the chassis at the outdoor unit only.

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- .3 Unit controls shall operate the indoor unit using one (1) of five (5) operating modes:
 - .1 Auto operation;
 - .2 Heating;
 - .3 Cooling;
 - .4 Dry; and
 - .5 Fan only.
 - .9 Electrical:
 - .1 Unit electrical power shall be 208-230V, 1-phase, 60Hz.
 - .2 Unit shall be capable of operating within voltage limits of $\pm 10\%$ of rated voltage.
 - .10 Controls:
 - .1 Indoor unit shall be equipped with wired controller.
 - .4 Condenser (Outdoor Unit) 19PAS10:
 - .1 General:
 - .1 Outdoor unit shall be capable of the following operating ambient range:
 - .1 Cooling: -10°C to 48°C (14°F DB to 118°F DB).
 - .2 Heating: -20°C to 18°C (-4°F to 64°F DB).
 - .2 Refrigerant circuit for multi-zone system shall be:
 - .1 Field piped to the various indoor units to effectively and efficiently control the heating/cooling operating of the multiple zones; and
 - .2 All refrigerant piping from the outdoor to indoor units shall be field insulated.
 - .3 Factory installed microprocessor controls in the outdoor unit and indoor units shall perform functions to efficiently operate the multi-zone system and communicate in a tree configuration from outdoor unit to indoor units via minimum 18AWG, 4-conductor, stranded, shielded or unshielded power/communication cable. If shielded wiring is used, it must be grounded to chassis at outdoor unit only.
 - .4 The multi-zone piping system shall have the ability to connect between two (2) and four (4) indoor units.
 - .5 System shall be capable of performing continuous operation even when power is turned off to an individual indoor unit.
 - .6 Outdoor unit shall be internally assembled, wired and piped from the factory.
 - .7 Factory assembled system shall have outdoor unit fitted with refrigerant strainer, check valves, oil separator, accumulator, 4-way reversing valve, electronic expansion valves, high side and low side refrigerant charging ports, and a service port.

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- .2 Piping Capabilities:
 - .1 Outdoor unit shall be capable of operating at an elevation of 15m (49.2ft) above or below the indoor units.
 - .2 Outdoor unit shall be capable of operating with up to 75m (246ft) of total equivalent refrigerant piping length.
 - .3 Outdoor unit shall be capable of operating with up to 25m (82ft) of equivalent refrigerant piping length to the farthest indoor unit.
 - .3 Defrost Operations:
 - .1 Outdoor unit shall be capable of auto defrost operation to melt accumulated ice off heat exchanger. Defrost cycle control shall be based on outdoor ambient temperatures and outdoor unit heat exchanger temperatures.
 - .4 Oil Management:
 - .1 Outdoor unit shall have an oil injection mechanism to ensure a consistent film of oil on all moving compressor parts at low speed.
 - .2 Outdoor unit shall have an oil separator to separate oil mixed with refrigerant gas during compression and return oil to the compressor.
 - .5 Cabinet:
 - .1 Outdoor unit cabinet shall be made of pre-coated metal (PCM).
 - .2 Front and side panels of the outdoor unit shall be removable for access to internal components.
 - .3 Outdoor unit cabinet shall be testing in accordance with ASTM B-117 salt spray test procedures for a minimum of 1000 hours.
 - .6 Fan Assembly:
 - .1 Each outdoor unit, up to 3T capacity shall be equipped with one direct drive variable speed propeller fan with brushless digitally controlled (BDCL) motor with horizontal discharge.
 - .2 Fan blades shall be made of Acrylonitrile Butadiene Styrene (ABS) material.
 - .3 Fan shall be equipped with permanently lubricated bearings.
 - .4 Fan motor shall have variable speed to a maximum of 950RPM.
 - .5 Fan shall have a raised guard to help prevent contact with moving parts.
 - .7 Outdoor Coil:
 - .1 Outdoor unit shall have a factory built coil comprised of aluminium fins mechanically bonded to copper tubing.
 - .1 Aluminum fins shall have factory applied corrosion resistant GoldFin™ material.
 - .2 Coil coating shall be tested in accordance with ASTM B-117 salt spray test procedure for a minimum of 1000 hours.
 - .2 Outdoor unit coil shall be factory tested to a pressure of 600psig.
 - .3 Coil shall have a minimum of 14 fins per inch (FPI).
 - .4 Coil shall have a 2-row heat exchanger.
 - .5 Outdoor unit cabinet shall have a coil guard.

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- .8 Compressor:
 - .1 Outdoor unit shall be equipped with one hermetically sealed, digitally controlled, inverter driven twin-rotary compressor.
 - .2 Inverter driven, digitally controlled compressor shall be capable of operating in a frequency range from 20Hz to 100Hz with control in 1Hz increments.
 - .3 Compressor shall be mounted on vibration attenuating rubber grommets.
 - .4 Compressor shall use a factory charge of polyvinyl ether (PVE) oil.
 - .5 Compressor bearings shall have Teflon™ coating.
 - .6 Compressor shall be equipped with over-current protection.
 - .9 Sound Level:
 - .1 Outdoor unit shall have sound level not exceeding 56dB(A) tested in an anechoic chamber under ISO1996 standard.
 - .10 Sensors:
 - .1 Outdoor unit shall be equipped with the following:
 - .1 Suction temperature sensor.
 - .2 Discharge temperature sensor.
 - .3 High pressure sensor.
 - .4 Low pressure sensor.
 - .5 Outdoor temperature sensor.
 - .6 Outdoor unit heat exchanger temperature sensor.
 - .5 Refrigeration Piping:
 - .1 Complete with refrigerant metering devices and valves.
 - .2 Refer to Section 23 23 00 – Refrigerant Piping.
 - .6 Control Accessories:
 - .1 Controls Interface Type: dry contact for 3rd party thermostat controller.
 - .2 Electrical Features:
 - .1 Power supply 12VDC from indoor unit.
 - .2 Contact Rating: 3A @ 125VAC.
 - .3 Standard Control Features:
 - .1 Controls indoor unit operation with 3rd party thermostat or room temperature controller.
 - .2 Inputs for control of unit ON/OFF, Thermo ON/OFF, Mode (Cool/Heat/Fan) and Fan Speed (Low/Med/High).
 - .3 Outputs for operation and error status.
 - .4 Standard of Acceptance: LG Electronics PDRYCB300 or approved equivalent.

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- .7 Condensate Pumps 19CNP10A, 19CNP10B & 19CNP10B:
- .1 General:
 - .1 Complete condensate removal pump assembly designed for use in removing condensate from wall mounted ductless split air conditioning indoor units.
 - .2 Pump can be installed above the indoor unit, behind the unit, or in plastic conduit line-set channels. Reservoir features a clear tank and connects to the condensate gravity drain.
 - .3 Condensate pump assembly components are connected via a convenient communications wire and suction tube located within 1m (3.3ft) of each other.
 - .2 Pump-Controller:
 - .1 Equipment Sound Level: 21dB(A).
 - .2 Pump discharge outlet: 1/4".
 - .3 Elastomeric mounting grommets on pump housing bracket.
 - .4 Elastomeric passive vibration isolator used to dampen pump vibration.
 - .5 Electrical Features:
 - .1 Normally-closed related rated 8A resistive -250V alarm.
 - .2 1.5m (60") power cable.
 - .3 1m (3.3ft) communication cable (pump to reservoir).
 - .4 Thermal protection: 80°C (176°F).
 - .6 Ambient temperature range: 0°C to 60°C (32°F to 140°F)
 - .7 Maximum water temperature: 60°C (140°F).
 - .3 Reservoir:
 - .1 Clear reservoir for instant visual inspection of water level, float and filter.
 - .2 Hall effect ON/OFF level sensors with high water safety sensor feature.
 - .3 Extra-large filter screen for longer intervals between cleaning and simple to open reservoir for easy maintenance
 - .4 Multi-step drain hose adapter (1/2", 5/8" and 3/4").
 - .4 Standard of Acceptance: Little Giant EC-1 Series or approved equivalent.
- .8 Standard of Acceptance: LG Electric outdoor unit LMU30CHV and indoor units LMN078HVT and LSN120HSV as indicated on drawing schedule c/w dry contact 3rd party control interface PDRYCB300 and condensate pump removal systems Little Giant EC-1 Series or approved equivalents.

Part 3 Execution

3.1 INSTALLATION

- .1 Install where indicated on drawings and in accordance with manufacturer's instructions.
- .2 Install condenser on galvanized steel support angles.
- .3 Make all required piping connections.

3.2 DRAIN PANS

- .1 Install so that no water can accumulate and arrange for easy access for cleaning.

3.3 START-UP AND COMMISSIONING

- .1 Manufacturer to certify installation.
- .2 Manufacturer to provide verbal and written instructions to operating personnel.
- .3 Submit written report to NRC Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute (ANSI).
 - .1 ANSI C12.7-[1993(R1999)], Requirements for Watthour Meter Sockets.
 - .2 ANSI/IEEE C57.13-[93], Standard Requirements for Instrument Transformers.
- .2 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM B148-[97(03)], Standard Specification for Aluminum-Bronze Sand Castings.
- .3 National Electrical Manufacturer's Association (NEMA).
 - .1 NEMA 250-[03], Enclosures for Electrical Equipment (1000 Volts Maximum).
- .4 Air Movement and Control Association, Inc. (AMCA).
 - .1 AMCA Standard 500-D-[98], Laboratory Method of Testing Dampers For Rating.
- .5 Canadian Standards Association (CSA International).
 - .1 CSA-C22.1-[02], Canadian Electrical Code, Part 1 (19th Edition), Safety Standard for Electrical Installations.

1.2 SUBMITTALS

- .1 Submit shop drawings and manufacturer's installation instructions in accordance with Section 01 10 00 – General Instructions for equipment and devices.
- .2 Pre-Installation Tests: submit samples at random from equipment shipped, as requested by Departmental Representative for testing before installation. Replace devices not meeting specified performance and accuracy.

1.3 EXISTING CONDITIONS

- .1 Cutting & Patching: in accordance with Section 01 10 00 – General Instructions and as supplemented herein.
- .2 Repair surfaces damaged during execution of Work.
- .3 Turn over to Departmental Representative existing materials removed during construction and not identified for reuse.

Part 2 Products

2.1 GENERAL

- .1 Control devices of each category shall be of single manufacturer and same type.
- .2 External trim materials to be corrosion resistant. Internal parts to be assembled in watertight assembly.

- .3 Operating conditions: 0°C through 32°C with 10 – 90% RH (non-condensing) unless otherwise specified.
- .4 Terminations: use standard conduit box with slot screwdriver, twist on connections or connector blocks unless otherwise specified.
- .5 Transmitters and sensors to be unaffected by external transmitters including walkie-talkies.
- .6 Account for hysteresis, relation time, maximum and minimum limits in applications of sensors and controls.
- .7 Outdoor installations: use weatherproof construction in NEMA 4 enclosures.
- .8 Devices installed in user occupied space shall not exceed Noise Criteria (NC) of 35. Noise generated by any device shall not be detectable above space ambient conditions.

2.2 TEMPERATURE SENSORS

- .1 Room Temperature Sensors & Display Wall Modules:
 - .1 Room Temperature Sensors and Display Wall Modules
 - .2 To be similar to existing room temperature sensors and displace wall modules installed throughout building.
 - .3 Requirements:
 - .1 LCD display to show space temperature and temperature setpoint.
 - .2 Buttons for occupant selection of temperature setpoint and occupied/unoccupied mode.
 - .3 Jack connection for plugging in laptop personal computer, contractor supplied zone terminal unit and contactor supplied palm compatible handheld device for access to zone bus.
 - .4 Integral thermistor sensing element 10 000 ohms at 24°C.
 - .5 Accuracy: 0.2°C over range of 0 to 70°C.
 - .6 Stability: 0.02°C drift per year.
 - .7 Separate mounting base for ease of installation.
 - .4 Standard of Acceptance: Schneider Electric SE8300 or approved equivalent.

2.3 WIRING

- .1 In accordance with this specification section unless otherwise specified.
- .2 For wiring under 70V use FT6 rated wiring where wiring is no run in conduit. Other cases use FT4 wiring.
- .3 Wiring must be continuous without joints.
- .4 Conduit colour coding shall meet NRC Standards.

- .5 Sizes:
 - .1 Field wiring to digital device: #18AWG or #20AWG stranded twisted pair.
 - .2 Analog input & output: shielded #18 minimum solid copper or #20 minimum stranded twisted pair.

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 equipment, components so that manufacturer's and CSA labels are visible and legible after commission is complete.
- .2 Install field control devices in accordance with manufacturer's recommended methods, procedures and instructions.
- .3 Provide fire stopping where required in order to maintain fire rating integrity.
- .4 Electrical:
 - .1 Complete installation in accordance with CSA C22.1-[09], Canadian Electrical Code, Part 1 (21st Edition), Safety Standard for Electrical Installations.
 - .2 Terminate wires with screw terminal type connectors suitable for wire size and number of terminations.
 - .3 All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.
 - .4 All wiring and cabling including that within factory-fabricated panels shall be labeled at each end within 5cm (2") of termination with EMCS point name.
 - .5 Install Low Voltage Control Wiring EMT in the following circumstances:
 - .1 Mechanical rooms, electrical rooms, service rooms and exposed wiring. All wiring in mechanical rooms, electrical rooms, service rooms and exposed wiring, or where wiring is subject to damage shall be in EMT.
 - .2 Communication wiring shall be installed in EMT. Communication wiring to mean all wiring linking building controllers, field panels and Operator Work Stations (OWS).
 - .3 All wiring supplying power to all levels of controllers shall be in EMT.
 - .4 All wiring between building controllers, field panels and OWS shall be installed in EMT. Field panels to mean all panels not considered building controllers (ie. panels with I/P transducers).

-
- .6 EMT Installation:
- .1 EMT size to suit wiring requirements and to allow for future expansion capabilities specified for systems.
 - .2 Maximum EMT fill not to exceed 40%.
 - .3 Minimum EMT size is 1.905cm (3/4") unless it is to a final device where 1.27cm (1/2") shall be acceptable.
 - .4 Include one pull string in each EMT 1.905cm (3/4") or larger.
 - .5 Wherever possible, all wiring in EMT shall be installed as continuous lengths, with no splices permitted between termination points or junction boxes.
 - .6 Conceal all EMT, except within mechanical rooms, electrical rooms and service rooms. Install EMT to maintain minimum clearance of 15cm (6") from high-temperature equipment (ie. steam piping or flues).
 - .7 Flexible metal conduits and liquid-tight shall not exceed 0.3048m (1ft) in length and shall be supported at each end. Flexible metal conduits less than 1.27cm (1/2") electrical trade size shall not be used. In areas exposed to moisture, including chiller and boiler rooms, liquid-tight, flexible metal conduits shall be used.
 - .8 EMT shall be adequately supported, properly reamed at both ends, and left clean and free of obstructions. EMT sections shall be joined with steel set-screw connectors and couplings specific to EMT. Terminations must be made with fittings at boxes, and ends not terminating in boxes shall have bushing installed
 - .9 Design drawings do not show conduit layout.
 - .10 Do not run exposed conduits in normally occupied spaces unless otherwise indicated or unless impossible to do otherwise. Departmental Representative to review prior to work commencement.
- .5 Communication Wiring:
- .1 Contractor shall adhere to NRC Standard practices.
 - .2 Do not install communications wiring in raceway and enclosures containing Class 1 wiring.
 - .3 Maximum pulling, tension and bend radius for cable installation, as specified by cable manufacturer, shall not be exceeded during installation.
 - .4 Contractor shall verify the integrity of the entire network following cable installation. Use appropriate test measure for each particular cable.
 - .5 When a cable enters or exists a building, a lightning arrestor must be installed between the lines and ground. The lightning arrestor shall be installed according to manufacturer's instructions.
 - .6 All runs of communication wiring shall be unspliced length when that length is commercially available.
 - .7 All communication wiring shall be labelled to indicate origination and destination data.

3.3 TEMPERATURE SENSORS

- .1 Stabilize to ensure minimum field adjustments or calibrations.
- .2 Readily accessible and adaptable to each type of application to allow for quick easy replacement and servicing without special tools or skills.

3.4 PANELS

- .1 Arrange for conduit and tubing entry from top, bottom or either side.
- .2 Wiring and tubing within panels: locate in trays or individually clipped to back of panel.
- .3 Identify wiring and conduit clearly.

3.5 IDENTIFICATION

- .1 Identify field devices in accordance with NRC Standards.

3.6 TESTING AND COMMISSIONING

- .1 Calibrate and test field devices for accuracy and performance.
- .2 Make any and all necessary changes required to ensure devices function as per intended performance criteria.

END OF SECTION

Part 1 General

1.1 CONTROL DESIGN SCHEMATICS (CDS)

- .1 Prepare control schematic drawings for incorporation, using a drawing format approved by NRC Departmental Representative.
- .2 Ensure that the control schematic drawings are also suitable for use as graphic displays in the Operator Work Stations.
- .3 On control schematic drawings used as graphic displays in the Operator Work Stations, indicate the physical location i.e. the building room number, of each system and major piece of equipment.
- .4 Provide an overall EMCS Architecture Schematic, showing all systems, all network communication devices, all Operator Work Stations (OWS), etc.
- .5 Prepare an electrical wiring schematic for each system and for each motor linked to the EMCS installation. Preferably these schematics shall be regrouped with the Control Design Schematic CDS-xx of the system they represent. They must form part of the shop drawing submission and final maintenance manual documents.
- .6 All components in the electrical wiring schematic shall match the Input/Output Point Summary Table.
- .7 When the electrical wiring schematic is completed, coordinate closely with mechanical and electrical Divisions to eliminate duplication and ensure full completeness.
- .8 Prepare a separate control design schematic for each system and sub-system in the entire facility, showing schematics of all basic components forming part of the system. For example, for a typical HVAC system the CDS must show mixing chambers (plenums), dampers, filters, coils, control valves, circulating pumps, humidifiers, air washers and pumps, fans, variable inlet vanes, variable speed drives, air flow stations, location of relays and contacts for digital output points, etc.
- .9 The CDS must also show the relative location of all sensors and controlled devices.
- .10 The unique identifier for each system, point and type of point (AO, AI, DO, DI) must appear on each CDS.
- .11 Include pertinent additional operational information points as required such as calculated, duplicate or virtual points as well as fail safe position of output points.
- .12 Control Design Schematics and Input/Output Point Summary Tables should form part of final maintenance manual submissions.

1.2 INPUT/OUTPUT (I/O) POINT SUMMARY TABLES

- .1 The I/O Point Summary shall supplement the shop drawings and final maintenance manual deliverables. They must provide all details not included in the sequences of operation. A legend describing symbols and abbreviations used throughout the I/O Point Summary must be produced for each project.
- .2 Boxes which are irrelevant to the project shall not be left blank but shall be filled in with a symbol such as an oblique or an “x” to indicate that no entry is required.
- .3 If, during the design phase, information is unavailable to accurately complete this schedule, the unfilled boxes shall be completed by the control system designer with values that are estimated to most closely represent the true value. These values must, however, be identified as such in the table. Certain values that absolutely cannot be defined at design time (such as low amperage settings for adjustable current relays used to confirm motor status) may be identified as field (F) assignable at TAB/Commissioning time.
- .4 Naming convention to follow the NRC standard for point naming convention.

1.3 SEQUENCES OF OPERATION

- .1 Provide a detailed sequence of operation, based on the preliminary sequence of operations included in this specification and as outlined on the drawings to describe the functioning of the system including pertinent details relating to the intended control concept and, interactions with other systems. The sequence must detail conditions in the following modes:
 - .1 Stopped Mode.
 - .2 Start-up Process.
 - .3 Normal Operation – Winter and Summer Modes.
 - .4 Operation under emergency conditions, when applicable.
 - .5 Emergency power mode, when applicable.
- .2 The following is a sample sequence used to demonstrate the required format, and also provides the preliminary sequence of operations for project

M-19 ROOM 317 & ROOM 318 PROPOSED SEQUENCE OF OPERATION

- .1 General:
 - .1 A combination of existing chilled water fan coil unit(s) and supplemental ductless split AC unit(s) shall be interlocked to control space temperature.

- .2 Normal Operation:
 - .1 Winter Mode:
 - .1 When room space temperature is above setpoint (adjustable), the ductless split AC units shall be commanded to start to maintain space temperature.
 - .1 When room space temperature falls below setpoint (adjustable), below deadband of 3°C (adjustable) for an excess of 5 minutes (adjustable), ductless split AC units shall be disabled, and existing fan coil unit cooling coil control valves shall modulate to maintain space temperature.
 - .2 Summer Mode:
 - .1 When room space temperature is above setpoint (adjustable) and the cooling coil control valves for all existing fan coil units that service the space are confirmed 100% open, the ductless split AC units shall be commanded to start to maintain space temperature.
 - .1 When room space temperature falls below setpoint (adjustable), below deadband of 3°C (adjustable) for an excess of 5 minutes (adjustable), ductless split AC units shall be disabled, and existing fan coil unit cooling coil control valves shall modulate to maintain space temperature.
 - .3 The EMCS will monitor several points, and initiate an alarm condition on the OWS when a fault is detected for any of the following:
 - .1 Ductless split AC unit fault.
 - .2 High room temperature alarm.
 - .3 Low room temperature alarm.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

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 01 10 00 & 01 35 30.

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 lamicoïd 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 lamicoïd nameplates to be approved by the NRC Departmental Representative prior to fabrication.
- .6 Provide two sets of lamicoïd nameplates for each piece of equipment; one in English and one in French.
- .7 Lamicoïd 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.
- .16 Identify molded case breaker with lamicoid nameplate.

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 factory painted, 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 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 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 **stranded** 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 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 16mm (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 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 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 conduit of any size. 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 except the colored EMT specified in 260500.

END OF SECTION

Part 1 General

1.1 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 10 00.

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, or approved equal.

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 PANELBOARDS

- .1 600 volt rated power panelboards: bus and breakers rated for 25,000 amp r.m.s. symmetrical interrupting capacity at 600V or as indicated.
- .2 250 volt lighting panelboards to have minimum interrupting capacity of 10,000 amp r.m.s. symmetrical.
- .3 Panelboards that have a main breaker indicated in plan 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 for molded case circuit breaker, bolt-on breakers for miniature circuit breaker
- .9 Hinged door, trim finish: baked grey enamel.
- .10 Drip shield.
- .11 Surface mount with hinge door, unless otherwise indicated on drawing.
- .12 Complete circuit directory with typewritten legend showing description of each circuit.
- .13 Manufacturer: Square D or approved equal.

2.4 MOLDED 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.

Circuit breakers minimum interrupt rating: 25KA for 600/347V or greater if indicated.
- .6 Electronic trip unit as indicated by drawing.

LI: long time and instantaneous

LSI: long time, short time and instantaneous

LSIG: long time, short time , instantaneous and grounding

A: with Ammeter

E: with energy meter
- .7 On board control power for trip unit
- .8 Standard of acceptance: Square D or approved equal.

2.5 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 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.

3.4 MOLDED CASE CIRCUIT BREAKERS

- .1 Install circuit breakers as indicated.

3.5 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 01 10 00.

1.4 IDENTIFICATION

- .1 Identification as per Section 26 05 00.

Part 2 Products

2.1 WIRING DEVICES

- .1 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.
- .2 LED occupancy sensor (ceiling mounted):
 - .1 120V, suitable for use with installed light fixture.
 - .2 360° coverage pattern.
 - .3 No minimum load requirements.
 - .4 Adjustable delayed-OFF time.
 - .5 No field calibration or sensitivity adjustments required.
 - .6 Fire year warranty.
 - .7 Standard of acceptance: Philips LRM2377 or equivalent approved by NRC Departmental Representative.

- .3 LED dimmable motion switches:
 - .1 Dimmer with passive infrared sensors to control LED fixtures.
 - .2 180° sensor field-of-view.
 - .3 Up to 30'x30' major motion coverage and 20'x20' minor motion coverage.
 - .4 Occupancy sensor can be set too auto-on/auto-off or manual-on/auto-off.
 - .5 Adjustable timeout and high/low sensitivity adjustment.
 - .6 Adjustable settings for auto-on light level: 100%, 50%, last light level, or locked pre-set light level.
 - .7 Off warning fades lights to off over a period of 10 seconds.
 - .8 120V.
 - .9 5 year warranty.
 - .10 Standard of acceptance: Lutron MSCL-OP153M-WH.
- .4 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.
- .5 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 Multi-outlet covers as indicated.
- .6 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.
- .4 Locate roof top maintenance receptacle within 7.5m of the rooftop electrical equipment.

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.
 - .7 Roof top maintenance receptacle: 750mm above the finished roof.

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 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 10 00.
- .2 Include schematic, wiring, interconnection diagrams.
- .3 Indicate:
 - .1 Mounting method and dimensions.
 - .2 Starter size and type.
 - .3 Layout of identified internal and front panel components.
 - .4 Enclosure types.
 - .5 Wiring diagram for each type of starter.
 - .6 Interconnection diagrams.
- .4 Motors specified and supplied with mechanical equipment. Refer to Division 23.

1.3 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for motor starters for incorporation into manual specified in Section 01 10 00.
- .2 Include operation and maintenance data for each type and style of starter.

Part 2 Products

2.1 MATERIALS

- .1 Starters:
 - .1 IEC rated starters not acceptable.

2.2 MANUAL MOTOR STARTERS

- .1 Single and three phase manual motor starters of size, type, rating, and enclosure type as indicated, with components as follows:
 - .1 Switching mechanism, quick make and break.
 - .2 One and three overload heaters as indicated, manual reset, trip indicating handle.
- .2 Accessories:
 - .1 Toggle switch, key switch or pushbutton as specified.
 - .2 Indicating light: type and colour as indicated.
 - .3 Locking tab to permit padlocking in "ON" or "OFF" position.

- .3 Standard of acceptance: Square D, Class 2510 or approved equal.

2.3 FINISHES

- .1 Apply finishes to enclosure in accordance with Section 26 05 00.

2.4 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 260500.

Part 3 Execution

3.1 INSTALLATION

- .1 Install starters, connect power and control as indicated.
- .2 Install control devices and relay panels and interconnect as indicated.
- .3 Install correct fuses and overload device elements.
- .4 Megger all motors. Dry out motor if dampness is present in accordance with manufacturer's recommendations.
- .5 For installation of motor with mechanical equipment refer to Division 23.
- .6 Make connection to motor as indicated. Use liquid-tight PVC jacketed flexible conduit between rigid conduit and motor.
- .7 Make flexible conduit long enough to permit movement of motor.

3.2 TESTS

- .1 Perform tests in accordance with Section 26 05 00 and Manufacturer's instructions.
- .2 Operate switches, contactors to verify correct functioning.
- .3 Perform starting and stopping sequences of contactors and relays.
- .4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate 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 01 10 00.
- .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 Refer to luminaire schedule on 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 Unless otherwise specified support fluorescent luminaires mounted in continuous rows once every 3.6 m (12').

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 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 REFERENCES

- .1 Telecommunications Industry Association (TIA)
 - .1 ANSI/TIA/EIA 569-D, Commercial Building Standard for Telecommunications Pathways and Spaces.

1.3 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.

Part 2 Products

2.1 MATERIALS

- .1 Raceways: Minimum 19mm (3/4") EMT larger sizes as indicated on drawing. Factory painted blue as per section 26 05 00.
- .2 Tele-Power poles/Jiffy poles: type as indicated on drawings.
- .3 Floor mounted outlets: type as indicated on drawings.

Part 3 Execution

3.1 CONDUIT SYSTEM

- .1 Conduit and cable pathways installation shall comply with ANSI/TIA/EIA 569-D.
- .2 Run conduit from wall outlets to pull box above false ceiling or to a point indicated on drawings.
- .3 Install a steel pull box after every two 90° bends, or equivalent; or where there is a (U-shaped) bend in the run.
- .4 Install additional steel pull boxes where necessary so that throughout the entire system, wires may be pulled in or withdrawn with reasonable ease. No section of conduit shall be longer than 30m (100ft) between pull points.
- .5 Pull boxes shall be placed in a straight section of conduit and shall not be used in lieu of a bend. The corresponding conduit ends shall be aligned with each other.

- .6 Where a pull box is required with conduits equal or smaller than 27mm (1"), an outlet box may be used as a pull box. For conduits above 27mm (1"), the pull box shall be size as per ANSI/TIA/EIA 569-D or as noted on the drawings.
- .7 Bending radius for conduits equal or less than 50mm (2") shall be no less than 6 times the internal diameter of the conduit. Bending radius for conduits more than 50mm (2") shall be no less 10 times the internal diameter.
- .8 No conduit body (Condulet), LB type or other, shall be used unless otherwise indicated on the drawings or pre-approved by the departmental representative.
- .9 Conduits shall be reamed to eliminate sharp edges and terminated with insulating nylon bushings.
- .10 Install nylon pull-cords in all empty conduits.
- .11 Clearly identify conduits at each end.
- .12 Paint all elbows and pull box covers blue. (This identifies the conduit as conduit dedicated to voice/data wiring.)
- .13 Do not run communications cables in the same raceway as power and lighting conductors.
- .14 Grounding and bonding to the Canadian Electrical Code (CEC).

3.2 MOUNTING

- .1 Recess mount wall outlets unless otherwise indicated. Mount wall outlets to height specified in section 26 27 26 or as indicated.

3.3 WORK BY OTHERS

- .1 Cables and terminations.

END OF SECTION



MP1 Montant à payer – Généralités

1.1 Sous réserve de toutes autres dispositions du Contrat, Sa Majesté paie à l'Entrepreneur, aux dates et de la manière énoncées ci-après, le montant par lequel:

1.1.1 l'ensemble des montants prévus à l'article MP2 excède,

1.1.2 l'ensemble des montants prévus à l'article MP3

et l'Entrepreneur accepte le paiement comme paiement final de tout ce qu'il a fourni et fait relativement aux travaux auxquels le paiement se rapporte.

MP2 Montants payables à l'Entrepreneur

2.1 Les montants mentionnés à l'alinéa MP1.1.1 sont l'ensemble :

2.1.1 des montants prévus dans les Articles de convention; et

2.1.2 le montant, s'il en est, payable à l'Entrepreneur conformément aux Conditions générales.

MP3 Montants payables à Sa Majesté

3.1 Les montants mentionnés à l'alinéa MP1.1.2 sont l'ensemble des montants, s'il en est, que l'Entrepreneur est tenu de payer à Sa Majesté en vertu du Contrat.

3.2 Dans tout paiement fait à l'Entrepreneur, le fait pour Sa Majesté d'omettre de déduire d'un montant mentionné à l'article MP2 un montant mentionné au paragraphe MP3.1 ne peut constituer un abandon de son droit de faire une telle déduction, ni une reconnaissance de l'absence d'un tel droit lors de tout paiement ultérieur à l'Entrepreneur.

MP4 Date de paiement

4.1 Dans les présentes modalités de paiement :

4.1.1 «période de paiement» signifie un intervalle de 30 jours consécutifs ou tout autre intervalle plus long convenu entre l'Entrepreneur et le représentant ministériel;

4.1.2 un montant est «dû et payable» lorsqu'il doit être versé à l'Entrepreneur par Sa Majesté selon les paragraphes MP4.4, MP4.7 ou MP4.10;

4.1.3 un montant est en souffrance lorsqu'il demeure impayé le premier jour suivant le jour où il est dû et payable;

4.1.4 «date de paiement» signifie la date du titre négociable d'un montant dû et payable par le Receveur général du Canada et émis aux fins de paiement;

4.1.5 «taux d'escompte» signifie le taux d'intérêt, fixé par la Banque du Canada, en vigueur à l'ouverture des bureaux à la date de paiement.

4.2 À l'expiration d'une période de paiement, l'Entrepreneur doit remettre au représentant ministériel



une demande d'acompte par écrit et y décrire toute partie achevée des travaux et tous les matériaux livrés aux lieux des travaux, mais non incorporés aux travaux, durant la période de paiement faisant l'objet de la demande d'acompte.

- 4.3 Le représentant ministériel, dans les dix jours suivant réception d'une demande d'acompte mentionnée au paragraphe MP4.2 :
- 4.3.1 fait l'inspection de la partie des travaux et des matériaux qui y sont décrits, et
 - 4.3.2 présente un rapport sur le progrès des travaux, dont le représentant ministériel envoie une copie à l'Entrepreneur, indiquant la valeur de la partie des travaux et des matériaux décrits dans la demande d'acompte que, selon le représentant ministériel :
 - 4.3.2.1 sont conformes aux dispositions du Contrat, et
 - 4.3.2.2 n'étaient visés par aucun autre rapport concernant des travaux du Contrat.
- 4.4 Sous réserve de l'article MP1 et du paragraphe MP4.5, Sa Majesté, au plus tard 30 heures après la réception par le représentant ministériel de la demande d'acompte mentionnée au paragraphe MP4.2, paie à l'Entrepreneur :
- 4.4.1 une somme égale à 95% de la valeur indiquée dans le rapport sur le progrès des travaux mentionné à l'alinéa MP4.3.2, si l'Entrepreneur a fourni un cautionnement pour le paiement de la main-d'œuvre et des matériaux, ou
 - 4.4.2 un montant égal à 90% de la valeur indiquée dans le rapport sur le progrès des travaux mentionné à l'alinéa 4.3.2, si l'Entrepreneur n'a pas fourni un cautionnement pour le paiement de la main-d'œuvre et des matériaux.
- 4.5 Il est essentiel, pour que Sa Majesté s'acquitte de son oblégation mentionnée au paragraphe MP4.4, que l'Entrepreneur fasse et remette au représentant ministériel,
- 4.5.1 une déclaration conforme à celle décrite au paragraphe MP4.6, pour les travaux et matériaux visés dans la demande d'acompte prévue au paragraphe MP4.2,
 - 4.5.2 dans le cas de la première demande d'acompte de l'Entrepreneur, un calendrier d'exécution conformément aux parties pertinentes des Devis, et
 - 4.5.3 si un calendrier est exigé, sa mise à jour aux moments précisés dans les parties pertinentes des Devis.
- 4.6 Dans la déclaration mentionnée au paragraphe MP4.5, l'Entrepreneur atteste :
- 4.6.1 qu'au jour de la demande d'acompte de l'Entrepreneur, l'Entrepreneur s'est acquitté de toutes ses obligations légales aux termes des Conditions de travail, et
 - 4.6.2 qu'au jour de la précédente demande d'acompte, l'Entrepreneur s'est acquitté de toutes ses obligations légales envers ses sous-entrepreneurs et ses fournisseurs de matériaux en ce qui concerne les travaux visés par le Contrat.



- 4.7 Sous réserve de l'article MP1 et du paragraphe MP4.8, Sa Majesté verse à l'Entrepreneur, dans les 30 jours suivant la date de délivrance du Certificat provisoire d'achèvement mentionné au paragraphe CG44.2, la somme mentionnée à l'article MP1, moins l'ensemble :
- 4.7.1 de tous les paiements effectués conformément au paragraphe MP4.4;
 - 4.7.2 du montant égal au coût pour Sa Majesté, estimé par le représentant ministériel de la correction de toutes déficiences dans les travaux et décrites dans le Certificat provisoire d'achèvement; et
 - 4.7.3 du montant égal au coût pour Sa Majesté, estimé par le représentant ministériel de l'achèvement de toute partie des travaux décrite dans le Certificat provisoire d'achèvement ne comportant pas la correction des déficiences visées par l'alinéa MP4.7.2.
- 4.8 Il est essentiel, pour que Sa Majesté s'acquitte de son obligation mentionnée au paragraphe MP4.7, que l'Entrepreneur fasse et remette au représentant ministériel,
- 4.8.1 une déclaration conforme à celle décrite au paragraphe MP4.9 relativement au Certificat provisoire d'achèvement mentionné au paragraphe CG44.2, et
 - 4.8.2 s'il est précisé dans les parties pertinentes des Devis, une mise à jour du calendrier d'exécution mentionné à l'alinéa MP4.5.2 qui, en plus des exigences énoncées, soit suffisamment détaillé concernant l'achèvement des travaux non-terminés et la correction de tous les défauts, le tout à la satisfaction du représentant ministériel.
- 4.9 Dans la déclaration mentionnée au paragraphe MP4.8, l'Entrepreneur atteste qu'au jour de l'émission du Certificat provisoire d'achèvement :
- 4.9.1 l'Entrepreneur s'est acquitté de toutes ses obligations légales aux termes des Conditions de travail;
 - 4.9.2 l'Entrepreneur s'est acquitté de toutes ses obligations légales envers ses sous-entrepreneurs et ses fournisseurs de matériaux en ce que concerne les travaux visés par le Contrat; et
 - 4.9.3 l'Entrepreneur s'est acquitté de toutes ses obligations mentionnées au paragraphe CG14.6.
- 4.10 Sous réserve de l'article MP1 et du paragraphe MP4.11, Sa Majesté verse à l'Entrepreneur, dans les 60 jours suivant la date de délivrance du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, la somme mentionnée à l'article MP1, moins l'ensemble :
- 4.10.1 de tous les paiements effectués conformément au paragraphe MP4.4, et
 - 4.10.2 de tous les paiements effectués conformément au paragraphe MP4.7.
- 4.11 Il est essentiel, pour que Sa Majesté s'acquitte de son obligation mentionnée au paragraphe MP4.10, que l'Entrepreneur fasse et remette au représentant ministériel une déclaration conforme



à celle décrite au paragraphe MP4.12.

- 4.12 Dans la déclaration mentionnée au paragraphe MP4.11, l'Entrepreneur atteste, outre les mentions requises en vertu du paragraphe MP4.9, que l'Entrepreneur s'est acquitté de toutes ses obligations légales et qu'il a satisfait à toutes les réclamations légales formulées contre lui par suite de l'exécution des travaux.

MP5 Le rapport sur le progrès des travaux et le paiement y afférent ne lient pas Sa Majesté

- 5.1 Ni le rapport sur le progrès des travaux mentionné au paragraphe MP4.3, ni les paiements effectués par Sa Majesté en conformité des Modalités ne doivent être interprétés comme une admission que les travaux et les matériaux sont, en totalité ou en partie, complets, satisfaisants ou conformes au Contrat.

MP6 Retard du paiement

- 6.1 Nonobstant l'article CG7, le retard apporté par Sa Majesté à faire un paiement à sa date d'exigibilité en vertu du présent Contrat, ne constitue pas un bris du Contrat.
- 6.2 Sa Majesté versera, sans que l'Entrepreneur le demande, des intérêts simples au taux d'escompte plus 1 ¼ p. 100 sur les montants en souffrance en vertu de l'alinéa MP4.1.3, intérêts qui s'appliquent à compter du premier jour de retard jusqu'au jour précédant la date de paiement, sauf que
- 6.2.1 les intérêts se seront ni exigibles ni versés à moins que le montant dont il est question au paragraphe MP6.2 ait été en souffrance pendant plus de 15 jours suivant :
- 6.2.1.1 la date à laquelle ladite somme est devenue due et payable, ou
- 6.2.1.2 la date de réception par le représentant ministériel de la déclaration conforme à celle décrite aux paragraphes MP4.5, MP4.8 ou MP4.11;
- selon la plus avancée de ces deux dates, et
- 6.2.2 les intérêts ne seront ni exigibles ni versés sur les paiements anticipés en souffrance, le cas échéant.

MP7 Droit de compensation

- 7.1 Sans restreindre tout droit de compensation ou de retenue découlant explicitement ou implicitement de la loi ou d'une disposition quelconque du Contrat, Sa Majesté peut opérer compensation de toute somme due par l'Entrepreneur à Sa Majesté en vertu du Contrat ou de tout contrat en cours, à l'encontre des sommes dues par Sa Majesté à l'Entrepreneur en vertu du Contrat.
- 7.2 Pour les fins du paragraphe MP7.1, l'expression «contrat en cours» signifie un contrat entre Sa Majesté et l'Entrepreneur :
- 7.2.1 en vertu duquel l'Entrepreneur est légalement obligé d'exécuter ou de fournir du travail,



de la main-œuvre ou des matériaux; ou

- 7.2.2 à l'égard duquel Sa Majesté a, depuis la date à laquelle les présents Articles de convention sont intervenus, exercé le droit de retirer à l'Entrepreneur les travaux faisant l'objet du contrat.

MP8 Paiement en cas de résiliation

- 8.1 En cas de résiliation du Contrat conformément à l'article CG41, Sa Majesté paie à l'Entrepreneur le plus tôt possible eu égard aux circonstances, tout montant qui lui est légalement dû et payable.

MP9 Intérêts sur les réclamations réglées

- 9.1 Sa Majesté versera à l'Entrepreneur des intérêts simples sur le montant d'une réclamation réglée, au taux d'escompte moyen plus q $\frac{1}{4}$ p. 100 à compter du premier jour de retard jusqu'au jour précédant la date de paiement.
- 9.2 Aux fins du paragraphe MP9.1:
- 9.2.1 une réclamation est réputée être réglée lorsqu'une entente par écrit est signée par le représentant ministériel et l'Entrepreneur et fait état du montant de la réclamation à verser par Sa Majesté et des travaux pour lesquels ledit montant doit être versé;
- 9.2.2 le «taux d'escompte moyen» signifie le taux d'intérêt moyen, fixé par la Banque du Canada, en vigueur à la fin de chaque mois civil au cours de la période pendant laquelle la réclamation réglée était impayée;
- 9.2.3 une réclamation réglée est réputée être impayée à compter de la journée qui suit immédiatement la date à laquelle la réclamation était due et payable conformément au Contrat, s'il n'y avait pas eu contestation.
- 9.3 Aux fins de l'Article MP9, une réclamation signifie tout montant faisant l'objet d'un litige et assujéti à des négociations entre Sa Majesté et l'Entrepreneur en vertu du Contrat.



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CG1 Interpretation

1.1 Dans le Contrat:

- 1.1.1 tout renvoi à une autre partie du Contrat désignée par des numéros précédés de lettres est censé renvoyer à la partie du Contrat qui est désignée par cette combinaison de lettres et de chiffres, de même qu'à toute autre partie du Contrat qui y est mentionnée ;
- 1.1.2 « Contrat » signifie les documents mentionnés dans les Articles de convention;
- 1.1.3 « garantie du contrat » signifie toute garantie fournie à Sa Majesté par l'Entrepreneur conformément au Contrat;
- 1.1.4 « le représentant ministériel » signifie l'officier ou l'employé de Sa Majesté désigné aux Articles de convention et toute personne autorisée spécialement par le représentant ministériel à accomplir, en son nom, n'importe laquelle des fonctions qui lui sont confiées en vertu du Contrat, et signalée comme tel par écrit à l'Entrepreneur;
- 1.1.5 « matériaux » comprend toutes les marchandises, articles et choses à être fournies par ou pour l'Entrepreneur en vertu du Contrat, pour être incorporés dans les travaux;
- 1.1.6 « Ministre » comprend une personne agissant pour ou, si la charge est sans titulaire, à la place du Ministre ou des personnes lui succédant, de même que son ou leurs adjoints ou représentants dûment nommés aux fins du Contrat;
- 1.1.7 « personne » comprend, sauf lorsque le contexte exige une interprétation différente, une société, une entreprise, une firme, une co-entreprise, un consortium et une corporation;
- 1.1.8 « outillage » comprend les animaux, outils, instruments, machines, véhicules, bâtiments, ouvrages, équipements et marchandises, articles et choses autres que les matériaux, qui sont nécessaires à l'exécution des travaux;
- 1.1.9 « sous-entrepreneur » signifie une personne à qui l'Entrepreneur a, conformément à l'article CG4, confié l'exécution des travaux en tout ou en partie;
- 1.1.10 « surintendant » signifie l'employé de l'Entrepreneur désigné par ce dernier pour remplir les fonctions décrites à l'article CG19;
- 1.1.11 « travaux » comprend, sous réserve de toute stipulation expressément contraire dans le Contrat, tout ce que l'Entrepreneur doit faire, fournir, livrer ou accomplir pour l'exécution du Contrat.

1.2 Sauf quant à ceux apparaissant aux Plans et devis, les en-têtes apparaissent dans le Contrat, ne font pas partie du Contrat, mais y sont uniquement pour fin d'utilité pratique.

1.3 Aux fins de l'interprétation du Contrat, en cas de contradiction ou de divergence entre les Plans et devis et les Conditions générales, les Conditions générales prévalent.

1.4 Dans l'interprétation des Plans et devis, en cas de contradiction ou de divergence entre :

- 1.4.1 les Plans et les devis, les devis prévalent;
- 1.4.2 les plans, les plans tracés à l'échelle la plus grande prévalent; et
- 1.4.3 les dimensions exprimées en chiffres et les dimensions à l'échelle, les dimensions exprimées en chiffres prévalent.

CG2 Successeurs et ayants droit

- 2.1 Le Contrat est au bénéfice des parties au Contrat, de même que de leurs héritiers légaux, exécuteurs, administrateurs, successeurs et ayants droit, qui sont tous par ailleurs liés par ses dispositions.

CG3 Cession du Contrat

- 3.1 L'Entrepreneur ne peut céder le Contrat, en tout ou en partie, sans le consentement écrit du Ministre.

CG4 Sous-traitance par l'Entrepreneur

- 4.1 Sous réserve des Conditions générales, l'Entrepreneur peut sous-traiter une partie quelconque des travaux.
- 4.2 L'Entrepreneur doit aviser le représentant ministériel par écrit de son intention de sous-traiter.
- 4.3 L'avis mentionné au paragraphe CG4.2 doit identifier le sous-entrepreneur de même que la partie des travaux qu'il entend lui confier.
- 4.4 Le représentant ministériel peut s'objecter à la sous-traitance projetée en avisant par écrit l'Entrepreneur dans les six jours suivant la réception par le représentant ministériel de l'avis mentionné au paragraphe CG4.2.
- 4.5 Si le représentant ministériel s'oppose à une sous-traitance en vertu du paragraphe CG4.4, l'Entrepreneur ne peut procéder à la sous-traitance envisagée.
- 4.6 L'Entrepreneur ne peut, sans la permission écrite du représentant ministériel, remplacer un sous-entrepreneur dont il a retenu les services conformément aux Conditions générales.
- 4.7 Tout contrat entre l'Entrepreneur et un sous-entrepreneur doit comporter tous les termes et conditions du Contrat qui sont d'application générale.
- 4.8 Nul contrat entre l'Entrepreneur et un sous-entrepreneur ou nul consentement de le représentant ministériel à tel contrat sera interprété comme relevant l'Entrepreneur de quelque obligation en vertu du Contrat ou comme imposant quelque responsabilité à Sa Majesté.

CG5 Modifications

- 5.1 Nulle modification ou changement à quelque disposition du Contrat aura d'effet avant que d'avoir été consignée par écrit.

CG6 Nulle obligation implicite

- 6.1 Il ne découlera du Contrat aucune disposition ou obligation implicite de la part de Sa Majesté; seules les dispositions expresses du Contrat, stipulées par Sa Majesté, doivent servir de fondement à tout droit contre Sa Majesté.
- 6.2 Le présent Contrat remplace toutes communications, négociations et ententes, écrites ou verbales, concernant les travaux et qui auraient en lieu avant la date du Contrat.

CG7 Caractère essentiel des délais et échéances

- 7.1 Le temps est l'essence même du Contrat.

CG8 Indemnisation par l'Entrepreneur

- 8.1 L'Entrepreneur doit tenir Sa Majesté indemne et à couvert de toutes réclamations, demandes, pertes, frais, dommages, actions, poursuites ou procédures de la part de quiconque, fondés, découlant, reliés, occasionnés ou attribuables aux activités de l'Entrepreneur, de ses employés, agents, sous-entrepreneurs et sous-entrepreneurs de ces derniers dans l'exécution des travaux faisant l'objet du Contrat, incluant toute contrefaçon ou prétendue contrefaçon d'un brevet d'invention ou de toute autre forme de propriété intellectuelle.
- 8.2 Aux fins du paragraphe CG8.1, le terme « activités » comprend tout acte ou omission, de même que tout retard à accomplir un acte.

CG9 Indemnisation par Sa Majesté

- 9.1 Sa Majesté, sous réserve des dispositions de la Loi sur la responsabilité de la Couronne, de la Loi sur les brevets et de toute autre loi affectant les droits, pouvoirs, privilèges ou obligations de Sa Majesté, doit tenir l'Entrepreneur indemne et à couvert de toutes réclamations, demandes, pertes, frais, dommages, actions, poursuites ou procédures découlant de ses activités en vertu du Contrat et directement attribuables à :
- 9.1.1 une absence ou un vice, actuel ou allégué, dans le titre de Sa Majesté concernant l'emplacement des travaux, ou
- 9.1.2 une contrefaçon ou prétendue contrefaçon par l'Entrepreneur de tout brevet d'invention ou de toute autre forme de propriété intellectuelle, dans l'exécution de tout acte aux fins de Contrat, comportant l'utilisation d'un modèle, d'un plan, d'un dessin ou de toute autre chose fournis par Sa Majesté à l'Entrepreneur aux fins des travaux.

CG10 Interdiction aux députés de la Chambre des communes de tirer profit d'un contrat

- 10.1 Conformément à la Loi sur le Parlement du Canada, il est expressément interdit à tout membre de la Chambre des communes de posséder quelque part ou intérêt dans le Contrat, ou d'en tirer quelque bénéfice ou profit.

CG11 Avis

- 11.1 Tout avis, consentement, ordre, décision, directive ou communication autre qu'un avis suivant le paragraphe CG11.4, qui peut être donné à l'Entrepreneur conformément au Contrat, peut être donné de quelque manière que ce soit.
- 11.2 Tout avis, consentement, ordre, décision, directive ou autre communication devant être donné par écrit à une partie ou une autre conformément au Contrat, sera, sous réserve du paragraphe CG11.4, réputé avoir été effectivement donné :
- 11.2.1 à l'Entrepreneur, s'il a été livré personnellement à l'Entrepreneur ou au surintendant de l'Entrepreneur, ou s'il a été envoyé par la poste, par télex ou par télécopieur à l'Entrepreneur, à l'adresse indiquée au paragraphe A4.1; ou
- 11.2.2 à Sa Majesté, s'il a été livré personnellement au représentant ministériel, ou s'il a été envoyé par la poste, par télex ou par télécopieur au représentant ministériel, à l'adresse indiquée à l'alinéa A1.2.1.
- 11.3 Tout avis, consentement, ordre, décision, directive ou autre communication donné conformément au paragraphe CG11.2 sera réputé avoir été reçu par l'une ou l'autre des parties :
- 11.3.1 le jour où il a été livré, s'il lui a été livré personnellement; ou
- 11.3.2 le jour de sa réception ou le sixième jour après son envoi par la poste, selon la première de ces deux dates, s'il lui a été envoyé par la poste, et
- 11.3.3 dans les 24 heures suivant sa transmission, s'il lui a été envoyé par télex ou par télécopieur.
- 11.4 S'il est livré personnellement, un avis donné en vertu de l'alinéa CG38.1.1 et des articles CG40 et CG41 sera remis à l'Entrepreneur ou, si l'Entrepreneur est une société, une firme, une co-entreprise ou une corporation, à un agent de l'administration ou à un cadre supérieur.

CG12 Matériaux, outillage et biens immobiliers fournis par Sa Majesté

- 12.1 Sous réserve du paragraphe CG12.2, l'Entrepreneur est responsable envers Sa Majesté de toute perte ou dommage, aux matériaux, à l'outillage ou aux biens immobiliers que Sa Majesté a fournis ou placés sous la garde et le contrôle de l'Entrepreneur aux fins du Contrat, que la perte ou le dommage soit attribuable ou non à des causes indépendantes de la volonté de l'Entrepreneur.
- 12.2 L'Entrepreneur n'est pas responsable envers Sa Majesté de toute perte ou dommage aux matériaux, à l'outillage ou aux biens immobiliers dont il est question au paragraphe CG12.1, si

cette perte ou ce dommage est imputable et directement attribuable à l'usure causée par un usage raisonnable.

- 12.3 L'Entrepreneur doit utiliser les matériaux, l'outillage ou les biens immobiliers dont il est question au paragraphe CG12.1, uniquement pour l'exécution du Contrat et pour aucune autre fin.
- 12.4 Lorsqu'après avoir été requis de le faire par le représentant ministériel, l'Entrepreneur n'a pas, dans un délai raisonnable, indemnisé Sa Majesté pour une perte ou un dommage dont il est responsable en vertu du paragraphe CG12.1, le représentant ministériel peut y pouvoir aux frais de l'Entrepreneur, et ce dernier est dès lors responsable envers Sa Majesté des frais en l'occurrence qu'il devra sur demande payer à Sa Majesté.
- 12.5 L'Entrepreneur doit tenir des registres que le représentant ministériel peut de temps à autre exiger des matériaux, de l'outillage et des biens immobiliers visés par le paragraphe CG12.1 et doit, lorsque le représentant ministériel le l'exige, établir à la satisfaction de ce dernier que les matériaux, l'outillage et les biens immobiliers sont à l'endroit et dans l'état dans lequel ils devraient être.

CG13 Matériaux, outillage et biens immobiliers devenus propriété de Sa Majesté

- 13.1 Sous réserve du paragraphe CG14.7, tous les matériaux et l'outillage, de même que tout droit de l'Entrepreneur sur tous les biens immobiliers, permis, pouvoirs et privilèges achetés, ou utilisés par l'Entrepreneur pour les travaux deviennent, à compter de l'époque où ils ont été achetés ou utilisés, la propriété de Sa Majesté aux fins des travaux et continuent de l'être :
- 13.1.1 dans le cas des matériaux, jusqu'à ce que le représentant ministériel déclare qu'ils ne sont plus requis pour les travaux; et
- 13.1.2 dans le cas de l'outillage, des biens immobiliers, des permis, des pouvoirs et des privilèges, jusqu'à ce que le représentant ministériel déclare que le droit dévolu à Sa Majesté en l'espèce n'est plus requis pour les travaux.
- 13.2 Les matériaux ou l'outillage appartenant à Sa Majesté en vertu du paragraphe CG13.1 ne doivent pas être enlevés des lieux des travaux, utilisés ou aliénés, sauf pour les travaux, sans le consentement écrit du représentant ministériel.
- 13.3 Sa Majesté n'est pas responsable de toute perte ou de tout dommage aux matériaux ou à l'outillage visés par le paragraphe CG13.1 quelle qu'en soit la cause et l'Entrepreneur est responsable de toute perte ou de tout dommage bien que ces matériaux ou outillage appartiennent à Sa Majesté.

CG14 Permis et taxes payables

- 14.1 L'Entrepreneur doit, dans les 30 jours de la date du Contrat, offrir à l'administration municipale, un montant égal à tous les droits et frais qui seraient payables à l'administration municipale pour les permis de construction, si les travaux étaient exécutés pour une personne autre que Sa Majesté.

- 14.2 Dans les dix jours qui suivent l'offre mentionnée au paragraphe CG14.1, l'Entrepreneur avise le représentant ministériel de sa démanche et du montant de cette offre et lui fait savoir si elle a été acceptée ou non par l'administration municipale.
- 14.3 Si l'administration municipale n'a pas accepté la somme offerte aux termes du paragraphe CG14.1, l'Entrepreneur remet ce montant à Sa Majesté dans les six jours suivant l'expiration du délai fixe au paragraphe CG14.2.
- 14.4 Aux fins des paragraphes CG14.1 et CG14.3, l'expression « administration municipale » signifie une administration qui aurait compétence pour autoriser la construction de l'ouvrage si le propriétaire n'en était pas Sa Majesté.
- 14.5 Nonobstant le lieu de résidence de l'Entrepreneur, l'Entrepreneur versera toute taxe applicable découlant de l'exécution des travaux visés par le Contrat.
- 14.6 Conformément à la déclaration mentionnée au paragraphe MP4.9, l'Entrepreneur dont ni le lieu de résidence ni la place d'affaires n'est dans la province où sont effectués les travaux visés par le Contrat, fournira à Sa Majesté une preuve d'enregistrement auprès des autorités provinciales responsables de la taxe de vente dans ladite province.
- 14.7 Aux fins du paiement de la taxe applicable ou de la fourniture d'une garantie de paiement de la taxe applicable découlant de l'exécution des travaux visés par le Contrat, l'Entrepreneur doit, malgré le fait que tous les matériaux et outillage, de même que des droits de l'Entrepreneur sur tous les biens immobiliers, permis, pouvoirs et privilèges, sont devenus la propriété de Sa Majesté après la date d'achat, payer, en tant qu'utilisateur ou consommateur, toute taxe applicable payable au moment de l'utilisation desdits matériaux, outillage ou droits de l'Entrepreneur à titre d'utilisateur, conformément aux lois pertinentes, ou fournir une garantie de paiement à cet égard.

CG15 Exécution des travaux sous la direction du représentant ministériel

- 15.1 L'Entrepreneur doit :
- 15.1.1 permettre au représentant ministériel d'avoir accès aux travaux et au chantier en tout temps au cours de l'exécution du Contrat;
 - 15.1.2 communiquer au représentant ministériel tous renseignements qu'il demande concernant l'exécution du Contrat; et
 - 15.1.3 fournir au représentant ministériel toute l'assistance possible dans l'accomplissement de son devoir de veiller à ce que les travaux soient exécutés conformément au Contrat, de même que dans l'accomplissement de tout autre devoir et dans l'exercice de tout pouvoir qui lui incombe ou qui lui est conféré par le Contrat.

CG16 Coopération avec d'autres Entrepreneurs

- 16.1 Lorsque, de l'avis du représentant ministériel, il est nécessaire d'affecter aux travaux ou au chantier d'autres entrepreneurs ou ouvriers, avec ou sans outillage et matériaux, l'Entrepreneur doit, à la satisfaction du représentant ministériel, leur donner accès aux travaux et coopérer avec

eux dans l'accomplissement de leurs fonctions et obligations.

16.2 Si :

16.2.1 l'affectation aux travaux d'autres entrepreneurs ou ouvriers en vertu du paragraphe CG16.1 ne pouvait être raisonnablement prévue par l'Entrepreneur au moment de la conclusion du Contrat; et

16.2.2 de l'avis du représentant ministériel, l'Entrepreneur a encouru des dépenses additionnelles afin de se conformer au paragraphe CG16.1; et

16.2.3 l'Entrepreneur a donné au représentant ministériel un avis écrit de sa réclamation avant l'expiration d'un délai de 30 jours à compter de l'affectation d'autres entrepreneurs ou ouvriers aux travaux ou au chantier;

Sa Majesté rembourse à l'Entrepreneur les frais encourus, calculés conformément aux articles CG48 à CG50, pour le travail, de l'outillage et des matériaux additionnels requis.

CG17 Vérification des travaux

17.1 Si, à un moment quelconque après le début des travaux mais avant l'expiration de la période de garantie, le représentant ministériel a des motifs de croire que les travaux en partie de ceux-ci n'ont pas été exécutés conformément au Contrat, il peut demander qu'une vérification de ces travaux soit effectuée par un expert qu'il désigne.

17.2 Si, par suite d'une vérification conformément au paragraphe CG17.1, il est établi que les travaux n'ont pas été exécutés suivant le Contrat, l'Entrepreneur doit, sur demande, payer à Sa Majesté tous les coûts et toutes les dépenses raisonnables que cette vérification lui aura occasionnés, en plus et sans préjudice aux droits et recours de Sa Majesté sous le Contrat, en droit ou en équité.

CG18 Déblaiement de l'emplacement

18.1 L'Entrepreneur garde les travaux et leur emplacement propres, sans rebuts, ni débris, et respecte à cet égard toute directive du représentant ministériel.

18.2 Avant l'émission du Certificat provisoire mentionné au paragraphe CG44.2, l'Entrepreneur enlève tout l'outillage et tous les matériaux non requis à l'exécution du reste des travaux. Il enlève également tous rebuts et débris et fait en sorte que les travaux et leur emplacement soient propres et convenables pour leur occupation par les employés de Sa Majesté, sauf indication contraire dans le Contrat.

18.3 Avant l'émission du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, l'Entrepreneur retire des travaux et leur emplacement, l'excédant de l'outillage et des matériaux, de même que tous les rebuts et débris.

18.4 Les obligations qu'imposent à l'Entrepreneur les paragraphes CG18.1 à CG18.3 ne s'appliquent pas aux rebuts et aux débris laissés par les employés de Sa Majesté, ou par les autres entrepreneurs et leurs employés visés au paragraphe CG16.1.

CG19 Surintendant de l'Entrepreneur

- 19.1 L'Entrepreneur désigne sans délai un surintendant après l'adjudication du Contrat.
- 19.2 L'Entrepreneur communique sans délai au représentant ministériel le nom, l'adresse et le numéro de téléphone du surintendant désigné en vertu du paragraphe CG19.1.
- 19.3 Le surintendant désigné en vertu du paragraphe CG19.1 à l'entière responsabilité des opérations de l'Entrepreneur dans l'exécution des travaux et il est en outre autorisé à recevoir au nom de l'Entrepreneur, tous avis, consentement, ordre, directive, décision ou toute autre communication qui peut lui être donné en vertu du Contrat.
- 19.4 Pendant les heures de travail et jusqu'à l'achèvement des travaux, l'Entrepreneur doit garder sur les lieux des travaux un surintendant compétent.
- 19.5 À la demande du représentant ministériel, l'Entrepreneur retire tout surintendant qui, de l'avis du représentant ministériel, est incompetent ou s'est conduit de façon malséante, et il remplace sans délai le surintendant ainsi retiré par un autre surintendant que le représentant ministériel estime acceptable.
- 19.6 Sous réserve du paragraphe CG19.5, l'Entrepreneur ne peut remplacer le surintendant sans le consentement écrit du représentant ministériel.
- 19.7 En cas de contravention par l'Entrepreneur au paragraphe CG19.6, le représentant ministériel peut refuser l'émission de tout Certificat mentionné à l'article CG44 jusqu'à ce que le surintendant ait été réintégré dans ses fonctions ou qu'un autre surintendant acceptable au représentant ministériel l'ait remplacé.

CG20 Sécurité nationale

- 20.1 Si le Ministre estime que la sécurité nationale le requiert, il peut ordonner à l'Entrepreneur :
- 20.1.1 de lui fournir tout renseignement sur des personnes engagées ou devant l'être aux fins du Contrat, et
- 20.1.2 de retirer des travaux et de leur emplacement toute personne dont l'emploi peut en l'occurrence, de l'avis du Ministre, comporter un risque pour la sécurité nationale.
- 20.2 Les contrats que l'Entrepreneur pourra conclure avec les personnes qui seront affectées à l'exécution des travaux, doivent contenir des dispositions qui lui permettront de s'acquitter de toute obligation qui lui incombent en vertu des articles CG19, CG20 et CG21.
- 20.3 L'Entrepreneur doit obéir à tout ordre donné par le Ministre suivant le paragraphe CG20.1.

CG21 Ouvriers inaptes

- 21.1 À la demande du représentant ministériel, l'Entrepreneur retire des travaux toute personne engagée par l'Entrepreneur aux fins des travaux qui, de l'avis du représentant ministériel, est incompétente ou s'est conduite de façon malséante et l'Entrepreneur refuse l'accès à l'emplacement des travaux à une personne ainsi retirée.

CG22 Augmentation ou diminution des coûts

- 22.1 Le montant établi dans les Articles de convention doit être ni augmenté, ni diminué en raison d'une augmentation ou d'une diminution du coût des travaux résultant d'une augmentation ou d'une diminution du coût du travail, de l'outillage, des matériaux ou des rajustements salariaux énoncés ou prescrits dans les Conditions de travail.
- 22.2 Nonobstant le paragraphe CG22.1 et l'article CG35, le montant énoncé dans les Articles de convention doit faire l'objet d'un redressement de la manière prévue au paragraphe CG22.3, en cas de modification à une taxe imposée en vertu de la Loi sur l'accise, de la Loi sur la taxe d'accise, de la Loi sur la sécurité de la vieillesse, de la Loi sur les douanes, du Tarif des douanes ou de toute loi provinciale sur la taxe de vente imposant une taxe de vente au détail sur l'achat de biens personnels corporels incorporés dans les biens immobiliers :
- 22.2.1 survenant après la date à laquelle l'Entrepreneur a présenté une soumission pour le Contrat,
- 22.2.2 s'appliquant aux matériaux; et
- 22.2.3 influant sur le coût de ces matériaux pour l'Entrepreneur.
- 22.3 En cas de changement fiscal suivant le paragraphe CG22.2, tout montant pertinent indiqué dans les Articles de convention sera augmenté ou diminué d'un montant égal qui, sur examen des registres mentionnés à l'article CG51, représente l'augmentation ou la diminution, selon le cas, des coûts directement attribuables à ce changement.
- 22.4 Aux fins du paragraphe CG22.2, lorsqu'une taxe fait l'objet d'un changement après la date à laquelle l'Entrepreneur a présenté une soumission mais alors que le ministre des Finances en avait donné avis public avant la date de présentation de la soumission, le changement fiscal est censé être survenu avant la date à laquelle la soumission a été présentée.

CG23 Main-d'œuvre et matériaux canadiens

- 23.1 L'Entrepreneur emploie pour l'exécution des travaux, de la main-d'œuvre et des matériaux canadiens dans toute la mesure où ils sont disponibles, compte tenu des exigences économiques et de la nécessité de poursuivre une exécution diligente des travaux.
- 23.2 Sous réserve du paragraphe CG23.1, l'Entrepreneur emploie, dans la mesure où elle est disponible, la main-d'œuvre de la localité où les travaux sont exécutés, et il recourt aux bureaux des Centres d'emploi du Canada pour recruter les ouvriers, là où la chose est réalisable.
- 23.3 Sous réserve des paragraphes CG23.1 et CG23.2, l'Entrepreneur emploie une proportion raisonnable d'ouvriers qui ont été en service actif dans les Forces armées canadiennes et qui en

ont reçu une libération honorable.

CG24 Protection des travaux et des documents

- 24.1 L'Entrepreneur garde et protège les travaux, l'emplacement des travaux, le Contrat, les devis, les plans, les dessins, les renseignements, les matériaux, l'outillage et les biens immobiliers, fournis ou non par Sa Majesté à l'Entrepreneur, contre toute perte ou dommage de quelque nature et ne peut les utiliser, donner, démolir ou en disposer sans le consentement écrit du Ministre, sauf si cela est indispensable à l'exécution des travaux.
- 24.2 Si une cote de sécurité est attribuée aux documents ou renseignements donnés ou dévoilés à l'Entrepreneur, l'Entreteneur prend toutes les mesures que lui enjoint le représentant ministériel pour assurer le degré de sécurité conforme à cette cote.
- 24.3 L'Entrepreneur fournit tous dispositifs de sécurité et aide toute personne à laquelle le Ministre a donné l'autorisation d'inspecter ou de prendre les mesures de sécurité qui s'imposent à l'égard des travaux et de l'emplacement des travaux.
- 24.4 Le représentant ministériel peut ordonner à l'Entrepreneur de faire telles choses et d'effectuer tels travaux additionnels qui, de l'avis du représentant ministériel, sont raisonnables et nécessaires pour assurer l'observation des paragraphes CG24.1 à CG24.3, ou pour rectifier une violation de ces paragraphes.

CG25 Cérémonies publiques et enseignes

- 25.1 L'Entrepreneur ne permet pas de cérémonie publique relativement aux travaux, sans la permission du Ministre.
- 25.2 L'Entrepreneur n'érige pas ou ne permet pas l'érection d'enseignes ou de panneaux publicitaires sur les travaux ou l'emplacement des travaux sans l'approbation du représentant ministériel.

CG26 Précautions contre les dommages, la transgression des droits, les incendies, et les autres dangers

- 26.1 L'Entrepreneur doit, à ses propres frais, faire le nécessaire pour s'assurer
- 26.1.1 que nulle personne n'est blessée, nul bien endommagé et nul droit, servitude ou privilège enfreint en raison de l'activité de l'Entrepreneur en vertu du Contrat;
 - 26.1.2 que la circulation à pied ou autrement sur les chemins ou cours d'eau publics ou privés n'est pas indûment entravée, interrompue ou rendue dangereuse par les travaux ou l'outillage;
 - 26.1.3 que les dangers d'incendie sur le chantier ou l'emplacement des travaux sont éliminés et que, sous réserve de tout ordre qui peut être donné par le représentant ministériel, tout incendie est promptement maîtrisé;

- 26.1.4 que la santé et sécurité des personnes occupées aux travaux ne sont pas menacées par les méthodes ou les moyens mis en œuvre;
- 26.1.5 que des services médicaux suffisants sont offerts en tout temps pendant les heures de travail, à toutes personnes occupées aux travaux;
- 26.1.6 que des mesures sanitaires suffisantes sont prises à l'égard des travaux et l'emplacement des travaux; et
- 26.1.7 que tous les jalons, bouées et repères placés sur les travaux ou l'emplacement des travaux par le représentant ministériel ou sur son ordre sont protégés et ne sont pas enlevés, abimés, changés ou détruits.

- 26.2 Le représentant ministériel peut ordonner à l'Entrepreneur de faire toute chose et de construire tout ouvrage additionnel qui, de l'avis du représentant ministériel, est raisonnable ou nécessaire pour assurer l'observation du paragraphe CG26.1 ou pour rectifier une infraction audit paragraphe.
- 26.3 L'Entrepreneur se conforme, à ses propres frais, à tout ordre que le représentant ministériel émet conformément au paragraphe CG26.2.

CG27 Assurances

- 27.1 L'Entrepreneur souscrit et maintient, à ses propres frais, des polices d'assurance relativement aux travaux et en fournit la preuve au représentant ministériel conformément aux exigences des Conditions d'assurance « E ».
- 27.2 Les polices d'assurance mentionnées au paragraphe CG27.1 doivent être :
 - 27.2.1 en la forme et nature, au montant, pour la durée et suivant les termes et conditions prévus aux Conditions d'assurance « E »; et
 - 27.2.2 prévoir le remboursement des demandes de règlement, conformément à l'article CG28.

CG28 Indemnité d'assurance

- 28.1 Dans le cas d'une demande de règlement en vertu d'une police d'assurance tous risques chantier (y compris les installations) que maintient l'Entrepreneur conformément à l'article CG27, les sommes dues à l'égard d'un sinistre seront remboursées directement à Sa Majesté, et :
 - 28.1.1 les sommes ainsi versées seront retenues par Sa Majesté aux fins du contrat; ou
 - 28.1.2 si Sa Majesté en décide ainsi, seront conservées par Sa Majesté, et le cas échéant, deviendront sa propriété de façon absolue.
- 28.2 Dans le cas d'une demande de règlement en vertu d'une police responsabilité civile générale que maintient l'Entrepreneur conformément à l'article CG27, l'assureur remboursera directement au

demandeur les sommes dues à l'égard d'un sinistre.

- 28.3 Si le Ministre choisit conformément au paragraphe CG28.1 de conserver l'indemnité d'assurance, il peut faire effectuer une vérification de la comptabilité de l'Entrepreneur et de Sa Majesté relativement à la partie des travaux perdue, endommagée ou détruite, afin d'établir la différence, s'il en est, entre
- 28.3.1 l'ensemble du montant des pertes ou dommages subis par Sa Majesté, incluant tous frais encourus pour le déblaiement et le nettoyage des travaux et l'emplacement des travaux et de toute autre somme payable par l'Entrepreneur à Sa Majesté en vertu du Contrat, moins toute somme retenue conformément à l'alinéa CG28.1.2; et
- 28.3.2 l'ensemble des sommes payables par Sa Majesté à l'Entrepreneur en vertu du Contrat à la date où la perte ou les dommages ont été subis.
- 28.4 Toute différence établie conformément au paragraphe CG28.3 doit être payée sans délai par la partie débitrice à la partie créancière.
- 28.5 Suite au paiement prévu au paragraphe CG28.4, Sa Majesté et l'Entrepreneur sont réputés libérés de tous droits et obligations en vertu du Contrat, à l'égard seulement de la partie des travaux qui a fait l'objet d'une vérification mentionnée au paragraphe CG28.3.
- 28.6 S'il n'est pas exercé de choix en vertu du paragraphe CG28.1.2, l'Entrepreneur, sous réserve du paragraphe CG28.7, déblaie et nettoie les travaux et l'emplacement des travaux et il restaure et remplace à ses frais la partie des travaux qui a été perdue ou endommagée, comme si ces travaux n'avaient pas encore été exécutés.
- 28.7 Lorsque l'Entrepreneur exécute les obligations prévues au paragraphe CG28.6, Sa Majesté lui rembourse, jusqu'à concurrence des sommes mentionnées au paragraphe CG28.1, les frais de déblaiement, nettoyage, restauration et remplacement en question.
- 28.8 Sous réserve du paragraphe CG28.7, tout paiement par Sa Majesté en exécution des obligations prévues au paragraphe CG28.7 est effectué conformément aux dispositions du Contrat, mais chaque paiement doit représenter 100% du montant réclamé, nonobstant les alinéas MP4.4.1 et MP4.4.2.

CG29 Garantie du contrat

- 29.1 L'Entrepreneur obtient et dépose auprès du représentant ministériel une ou des garanties conformément aux conditions de garantie du contrat.
- 29.2 S'il est déposé une garantie auprès du représentant ministériel en vertu du paragraphe CG29.1 constituant en tout ou en partie en un dépôt de garantie, ce dépôt sera traité conformément aux articles CG43 et CG45 des Conditions générales.
- 29.3 Si la garantie en vertu du paragraphe CG29.1 consiste, en partie, en un cautionnement (bond) pour le paiement de la main-d'œuvre et des matériaux, l'Entrepreneur affiche une copie de ce cautionnement sur l'emplacement des travaux.

CG30 Modifications aux travaux

- 30.1 Sous réserve de l'article CG5, le représentant ministériel peut, à tout moment avant de délivrer son Certificat définitif d'achèvement :
- 30.1.1 exiger des travaux ou des matériaux en sus de ceux qui ont été prévus dans les Plans et devis; et
 - 30.1.2 supprimer ou modifier les dimensions, le caractère, la quantité, la qualité, la description, la situation ou la position de la totalité ou d'une partie des travaux ou matériaux prévus dans les Plans et devis ou exigés en conformité de l'alinéa CG30.1.1.
- à condition que ces travaux ou matériaux supplémentaires, ou que ces suppressions ou modifications soient, selon lui compatibles avec l'intention du Contrat.
- 30.2 L'Entrepreneur exécute les travaux conformément aux ordres, suppressions et modifications émis de temps à autre par le représentant ministériel en vertu du paragraphe CG30.1, comme s'ils faisaient partie des Plans et devis.
- 30.3 Le représentant ministériel décide si ce que l'Entrepreneur a fait ou omis de faire conformément à un ordre, une suppression ou une modification en vertu du paragraphe CG30.1 a augmenté ou diminué le coût des travaux pour l'Entrepreneur.
- 30.4 Si le représentant ministériel décide, conformément au paragraphe CG30.3, qu'il y a eu augmentation du coût pour l'Entrepreneur, Sa Majesté paie à l'Entrepreneur le coût accru que l'Entrepreneur a nécessairement encouru pour les travaux supplémentaires, calculé conformément aux articles CG49 ou GB50.
- 30.5 Si le représentant ministériel décide, conformément au paragraphe CG30.3, qu'il y a eu réduction du coût pour l'Entrepreneur, Sa Majesté réduit le montant payable à l'Entrepreneur en vertu du Contrat d'un montant égal à la réduction du coût occasionné par toute suppression ou modification ordonnée conformément au paragraphe CG30.1.2, calculé conformément à l'article CG49.
- 30.6 Les paragraphes CG30.3 à CG30.5 s'appliquent seulement à un contrat ou partie d'un contrat comportant, suivant le Contrat, une Entente à prix fixe.
- 30.7 Tout ordre, suppression ou modification mentionné au paragraphe CG30.1 doit être par écrit, porter la signature du représentant ministériel et être communiqué à l'Entrepreneur conformément au paragraphe CG11.

CG31 Interprétation du Contrat par le représentant ministériel

- 31.1 Avant la délivrance par le représentant ministériel du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, le représentant ministériel tranche toute question concernant l'exécution des travaux ou les obligations de l'Entreteneur en vertu du Contrat et en particulier, mais sans limiter la portée générale de ce qui précède, concernant :

- 31.1.1 la signification de quoi que ce soit dans les Plans et devis;
 - 31.1.2 l'interprétation des Plans et devis au cas d'erreur, omission, obscurité ou divergence dans leur texte ou intention;
 - 31.1.3 le respect des exigences du Contrat quant à la quantité ou la qualité des matériaux ou du travail que l'Entrepreneur fournit ou se propose de fournir;
 - 31.1.4 la suffisance de la main-d'œuvre, de l'outillage ou des matériaux que l'Entrepreneur fournit pour la réalisation des travaux et du Contrat, pour assurer l'exécution des travaux suivant le Contrat et l'exécution du Contrat conformément à ses dispositions;
 - 31.1.5 la qualité de tout genre de travail effectué par l'Entrepreneur; ou
 - 31.1.6 l'échéancier et la programmation des diverses phases de l'exécution des travaux;
- et la décision du représentant ministériel est sans appel, pour ce qui est des travaux.
- 31.2 L'Entrepreneur exécute les travaux conformément aux décisions et directives du représentant ministériel en vertu du paragraphe CG31.1 et conformément à toute décision et directive du représentant ministériel que en découlent.

CG32 Garantie et rectification des défauts des travaux

- 32.1 Sans restreindre les garanties implicites ou explicites de la loi ou du Contrat, l'Entrepreneur doit, à ses propres frais
- 32.1.1 rectifier toute défectuosité et corriger tout vice qui se manifeste dans les travaux ou qui est signalé au Ministre quant aux parties du travail acceptées relativement au Certificat provisoire d'achèvement mentionné au paragraphe CG44.2 dans les 12 mois qui suivront la date d'émission du Certificat provisoire d'achèvement.
 - 32.1.2 rectifier toute défectuosité et corriger tout vice qui se manifeste dans les travaux ou qui est signalé au Ministre relativement aux parties des travaux décrites dans le Certificat provisoire d'achèvement mentionné au paragraphe CG44.2 dans les 12 mois qui suivent la date d'émission du Certificat définitif d'achèvement mentionné au paragraphe CG44.1.
- 32.2 Le représentant ministériel peut ordonner à l'Entrepreneur de rectifier ou corriger toute défectuosité ou tout vice mentionné au paragraphe CG32.1 ou couvert par toute autre garantie implicite ou explicite.
- 32.3 L'ordre mentionné au paragraphe CG32.2.1 doit être par écrit; il peut préciser le délai dans lequel l'Entrepreneur doit rectifier ou corriger la défectuosité ou le vice et il doit être donné à l'Entrepreneur conformément à l'article CG11.
- 32.4 L'Entrepreneur doit rectifier la défectuosité ou corriger le vice mentionné dans l'ordre donné en conformité du paragraphe CG32.2 dans le délai qui y est stipulé.

CG33 Défaut de l'Entrepreneur

- 33.1 Si l'Entrepreneur omet de se conformer à une décision ou directive rendue ou émise par le représentant ministériel en vertu des articles CG18, CG24, CG26, CG31 ou CG32, le représentant ministériel peut recourir aux méthodes qui lui semblent opportunes pour exécuter ce que l'Entrepreneur a omis d'exécuter.
- 33.2 L'Entrepreneur paie à Sa Majesté, sur demande, la totalité de tous les frais, dépenses et dommages encourus par Sa Majesté en raison du défaut de l'Entrepreneur de se conformer à toute décision ou directive stipulée au paragraphe CG31.1 et en raison de toute méthode utilisée en l'occurrence par le représentant ministériel conformément au paragraphe CG33.1.

CG34 Protestations des décisions du représentant ministériel

- 34.1 L'Entrepreneur peut contester, dans les dix jours de sa réception, une décision ou directive mentionnée aux paragraphes CG30.3 ou CG33.1.
- 34.2 Toute contestation mentionnée au paragraphe CG34.1 doit être par écrit, indiquer tous les motifs de la contestation, être signée par l'Entrepreneur et communiquée à Sa Majesté par l'entremise du représentant ministériel.
- 34.3 Si l'Entrepreneur proteste conformément au paragraphe CG34.2, le fait pour lui de se conformer à la décision ou à la directive qu'il conteste ne sera pas interprété comme une reconnaissance du bienfondé de cette décision ou de cette directive et ne pourra constituer une fin de non-recevoir quant à toute poursuite qu'il estimera appropriée dans les circonstances.
- 34.4 Tout protêt de l'Entrepreneur en vertu du paragraphe CG34.2 ne le dispense de se conformer à la décision ou directive en question.
- 34.5 Sous réserve du paragraphe CG34.6, l'Entrepreneur doit, sous peine de déchéance, intenter toute poursuite judiciaire mentionnée au paragraphe CG34.3 dans les trois mois suivant la date d'émission du Certificat définitif d'achèvement mentionné au paragraphe CG44.1.
- 34.6 L'Entrepreneur doit, sous peine de déchéance, intenter dans les trois mois suivant la fin d'une période de garantie, toute poursuite judiciaire mentionnée au paragraphe CG34.3 et découlant d'un ordre donné en vertu de l'article CG32.
- 34.7 Sous réserve du paragraphe CG34.8, si Sa Majesté tient la contestation de l'Entrepreneur comme bien fondée, elle doit lui rembourser le coût des travaux, de l'outillage et des matériaux additionnels nécessaires à l'exécution de l'ordre ou de la directive ayant fait l'objet du protêt.
- 34.8 Les couts mentionnés au paragraphe CG34.7 doivent être calculés conformément aux dispositions des articles CG48 à CG50.

CG35 Changement des conditions du sol – Négligence ou retard de la part de Sa Majesté

- 35.1 Sous réserve du paragraphe CG35.2, nul paiement autre qu'un paiement expressément stipulé au Contrat n'est fait par Sa Majesté à l'Entrepreneur en raison de quelque dépense supplémentaire

encourue ou pour quelque perte ou dommage subi par l'Entrepreneur.

35.2 Si l'Entrepreneur encourt des frais supplémentaires ou subit des pertes ou dommages directement attribuables :

35.2.1 à un écart substantiel entre les renseignements sur les conditions du sol à l'emplacement des travaux, dans les Plans et devis ou d'autres documents fournis à l'Entrepreneur pour l'établissement de sa soumission, ou à un écart substantiel entre une présomption raisonnable de l'Entrepreneur fondée sur lesdits renseignements et les conditions réelles rencontrées par l'Entrepreneur à l'emplacement des travaux lors de leur exécution; ou

35.2.2 à la négligence ou à un retard de la part de Sa Majesté après la date du Contrat, à fournir tout renseignement ou à tout acte auquel Sa Majesté est expressément obligée par le Contrat ou que les usages de l'industrie dicteraient ordinairement à tout propriétaire;

il doit dans les dix jours qui suivent la date de la constatation des conditions du sol décrites à l'alinéa CG35.2.1 ou la date de la négligence ou du retard décrit au paragraphe CG35.2.2, en donner avis par écrit au représentant ministériel et lui signifier son intention d'exiger le remboursement des frais supplémentaires encourus ou le coût de toutes pertes ou dommages subis.

35.3 Lorsque l'Entrepreneur a donné au représentant ministériel l'avis mentionné au paragraphe CG35.3, il doit sous peine de déchéance dans les 30 jours suivant la date de l'émission du Certificat définitif mentionné au paragraphe CG44.1, remettre au représentant ministériel une demande écrite de remboursement des frais supplémentaires ou du coût de toutes pertes ou dommages subis.

35.4 La demande de remboursement mentionnée au paragraphe CG35.3 devra contenir une description suffisante des faits et circonstances qui motivent la demande afin que le représentant ministériel puisse déterminer si cette demande est justifiée ou non, et l'Entrepreneur doit, à cette fin, fournir tout autre renseignement que le représentant ministériel peut exiger.

35.5 Si, de l'avis du représentant ministériel, la demande de remboursement mentionnée au paragraphe CG35.3 est bien fondée, Sa Majesté doit verser à l'Entrepreneur un supplément calculé en conformité des articles CG47 à CG49.

35.6 Si, de l'avis du représentant ministériel, le cas décrit à l'alinéa CG35.2.1 se traduit pour l'Entrepreneur par une économie dans l'exécution du Contrat, le montant établi dans les Articles de convention est, sous réserve du paragraphe CG35.7, réduit d'un montant égal à l'économie réalisée.

35.7 Le montant à être déduit en vertu du paragraphe CG35.6 doit être déterminé selon les dispositions des articles CG47 à CG49.

35.8 Si l'Entrepreneur néglige de donner l'avis mentionné au paragraphe CG35.2 et de présenter la demande de remboursement mentionnée au paragraphe CG35.3 dans le délai prescrit, aucun supplément ne doit lui être versé en l'occurrence.

CG36 Prolongation de délai

- 36.1 Sous réserve du paragraphe CG36.2, le représentant ministériel peut, s'il estime que l'achèvement en retard des travaux est attribuable à des causes indépendantes de la volonté de l'Entrepreneur et sur demande présentée par l'Entrepreneur avant le jour fixe par les Articles de convention pour l'achèvement des travaux ou avant toute autre date fixée auparavant conformément au présent article, prolonger le délai d'achèvement des travaux.
- 36.2 Toute demande mentionnée au paragraphe CG36.1 doit être accompagnée du consentement écrit de la compagnie dont le cautionnement constitue une partie de la garantie du contrat.

CG37 Dédommagement pour retard d'exécution

- 37.1 Aux fins du présent article :
- 37.1.1 les travaux sont censés être achetés le jour ou le représentant ministériel délivre le Certificat provisoire d'achèvement mentionné au paragraphe CG44.2; et
- 37.1.2 « période de retard » signifie la période commençant le jour fixé par les Articles de convention pour l'achèvement des travaux et se terminant le jour précédant immédiatement le jour de l'achèvement, à l'exclusion cependant de tout jour faisant partie d'une période de prolongation accordée en vertu du paragraphe CG36.1 et de tout autre jour où, de l'avis du représentant ministériel, l'achèvement des travaux a été retardé par des causes indépendantes de la volonté de l'Entrepreneur.
- 37.2 Si l'Entrepreneur n'achève pas les travaux au jour fixé par les Articles de convention mais achève ces travaux par la suite, l'Entrepreneur paie à Sa Majesté un montant égal à l'ensemble :
- 37.2.1 de tous les salaires, gages et frais de déplacement versés par Sa Majesté aux personnes surveillant les travaux pendant la période de retard;
- 37.2.2 des coûts encourus par Sa Majesté en conséquence de l'impossibilité pour Sa Majesté de faire usage des travaux achevés pendant la période de retard; et
- 37.2.3 de tous les autres frais et dommages encourus ou subis par Sa Majesté pendant la période de retard par suite de l'inachèvement des travaux à la date prévue.
- 37.3 S'il estime que l'intérêt public le commande, le Ministre peut renoncer au droit de Sa Majesté à la totalité ou partie d'un paiement exigible en conformité du paragraphe CG37.2.

CG38 Travaux retirés à l'Entrepreneur

- 38.1 Le Ministre peut dans les cas suivants et à son entière discrétion, en donnant un avis par écrite à l'Entrepreneur conformément à l'article CG11, retirer à l'Entrepreneur la totalité ou une partie des travaux et recourir aux moyens qui lui semblent appropriés pour achever les travaux si l'Entrepreneur :
- 38.1.1 fait défaut ou retarde à commencer les travaux ou à exécuter les travaux avec diligence et à la satisfaction du représentant ministériel, dans les six jours suivant la réception par

l'Entrepreneur d'un avis par écrite du Ministre ou du représentant ministériel, conformément à l'article CG11 :

- 38.1.2 a négligé d'achever quelque partie des travaux dans le délai imparti par le Contrat;
 - 38.1.3 est devenu insolvable :
 - 31.1.4 a commis un acte de faillite;
 - 31.1.5 a abandonné les travaux;
 - 31.1.6 a fait cession du Contrat sans le consentement requis au paragraphe CG3.1; ou
 - 31.1.7 a de quelque autre façon fait défaut d'observer ou d'accomplir l'une quelconque des dispositions du Contrat.
- 38.2 Si la totalité ou une partie quelconque des travaux a été retirée à l'Entrepreneur en vertu de paragraphe CG38.1.
- 38.2.1 l'Entrepreneur n'a droit, sauf dispositions du paragraphe CG38.4, à aucun autre paiement dû et exigible.
 - 38.2.2 l'Entrepreneur est tenu de payer à Sa Majesté, sur demande, un montant égal à la totalité des pertes et dommages que Sa Majesté aura subis en raison de défaut de l'Entrepreneur d'achever les travaux.
- 38.3 Si la totalité ou partie des travaux retirés à l'Entrepreneur en vertu du paragraphe CG38.1 est achevée par Sa Majesté, le représentant ministériel établit le montant, s'il y en a, de toute retenue ou demande d'acompte de l'Entreteneur existant au moment où les travaux lui ont été retirés et dont, selon le représentant ministériel, on n'a pas besoin pour assurer exécution des travaux ou pour rembourser à Sa Majesté les pertes ou dommages subis en raison du défaut de l'Entrepreneur.
- 38.4 Sa Majesté peut verser à l'Entrepreneur le montant qu'on jugera non requis suivant le paragraphe CG38.3.

CG39 Effet du retrait des travaux à l'Entrepreneur

- 39.1 La retrait de la totalité ou d'une partie des travaux à l'Entrepreneur en conformité de l'article CG38, n'a pas pour effet de libérer l'Entrepreneur d'une obligation quelconque découlant pour lui du Contrat ou de la loi, sauf quant à l'obligation pour lui de continuer l'exécution de la partie des travaux qui lui fut ainsi retirée.
- 39.2 Si la totalité ou partie des travaux est retirée à l'Entrepreneur en conformité de l'article CG38, tous les matériaux et outillage, ainsi que l'intérêt de l'Entrepreneur dans tous les biens immobiliers, permis, pouvoirs et privilèges acquis, utilisés ou fournis par l'Entrepreneur pour les travaux, continuent d'être la propriété de Sa Majesté sans indemnisation de l'Entrepreneur.
- 39.3 Si le représentant ministériel certifie que tout matériau, outillage ou un intérêt quelconque

mentionné au paragraphe CG39.2 n'est plus requis pour les travaux et qu'il n'est plus dans l'intérêt de Sa Majesté de retenir lesdits matériaux, outillage ou intérêt, ils sont remis à l'Entrepreneur.

CG40 Suspension des travaux par le Ministre

- 40.1 Le Ministre peut, lorsqu'il estime que l'intérêt public le commande, sommer l'Entrepreneur de suspendre l'exécution des travaux pour une durée déterminée ou indéterminée, en lui communiquant par écrit un avis à cet effet, conformément à l'article CG11.
- 40.2 Sur réception suivant l'article CG11 de la sommation mentionnée au paragraphe CG40.1, l'Entrepreneur suspend toutes les opérations sauf celles qui, de l'avis du représentant ministériel, sont nécessaires à la garde et à la préservation des travaux, de l'outillage et des matériaux.
- 40.3 Pendant la période de suspension, l'Entrepreneur ne peut enlever de l'emplacement, sans le consentement du représentant ministériel, quelque partie des travaux, de l'outillage et des matériaux.
- 40.4 Si la période de suspension est de 30 jours ou moins, l'Entrepreneur reprend l'exécution des travaux dès l'expiration de la période de suspension et il a droit au paiement des frais, calculés en conformité des articles CG48 à CG50, du travail, de l'outillage et des matériaux nécessairement encourus en conséquence de la suspension des travaux.
- 40.5 Si, à l'expiration d'une période de suspension de plus de 30 jours, le Ministre et l'Entrepreneur conviennent que l'exécution des travaux sera continuée par l'Entrepreneur, ce dernier reprend les opérations sous réserve des termes et conditions convenus entre lui et le Ministre.
- 40.6 Si, à l'expiration d'une période de suspension de plus de 30 jours, le Ministre et l'Entrepreneur ne conviennent pas que les travaux seront continués par l'Entrepreneur ou ne s'entendent pas sur les termes et conditions suivant lesquels l'Entrepreneur poursuivra l'exécution des travaux, l'avis de suspension est censé être un avis de résiliation et conformément de l'article CG41.

CG41 Résiliation du Contrat

- 41.1 Le Ministre peut, à n'importe quel moment, résilier le Contrat en donnant avis par écrit à cet effet à l'Entrepreneur conformément à l'article CG11.
- 41.2 Sur réception suivant l'article CG11 de l'avis mentionné au paragraphe CG41.1, l'Entrepreneur cesse toutes opérations dans l'exécution du Contrat, sous réserve de toutes conditions énoncées dans l'avis.
- 41.3 Si le Contrat est résilié conformément au paragraphe CG41.1, Sa Majesté paie à l'Entrepreneur, sous réserve du paragraphe CG41.4, un montant égal :
 - 41.3.1 au coût de tout le travail, l'outillage et les matériaux qu'aura fournis l'Entrepreneur en vertu du Contrat à la date de résiliation, en exécution d'un contrat ou d'une partie de contrat relativement auquel une Entente à prix unitaire est précisée dans le Contrat; ou

41.3.2 au moins :

41.3.2.1 du montant, calculé conformément aux Modalités de paiement, qui aurait été payable à l'Entrepreneur s'il avait achevé les travaux; et

41.3.2.2 du montant que l'on reconnaît devoir à l'Entrepreneur en vertu de l'article CG49, concernant un contrat ou une partie de contrat pour lequel le Contrat prévoit une Entente à prix fixe;

moins l'ensemble de tous les montants qui furent payés à l'Entrepreneur par Sa Majesté et de tous les montants dont l'Entrepreneur est redevable envers Sa Majesté en vertu du Contrat.

41.4 Si Sa Majesté et l'Entrepreneur ne peuvent convenir du montant mentionné au paragraphe CG41.3, ce montant sera déterminé suivant la méthode indiquée à l'article CG50.

CG42 Réclamations contre et obligations de la part de l'Entrepreneur ou d'un sous-entrepreneur

42.1 Afin d'acquitter toutes obligations légales de l'Entrepreneur ou d'un sous-entrepreneur ou de satisfaire à toutes réclamations légales contre eux résultant de l'exécution du Contrat, Sa Majesté peut payer tout montant qui est dû et payable à l'Entrepreneur en vertu du Contrat, directement aux créanciers de l'Entrepreneur ou du sous-entrepreneur, ou aux réclamants en l'occurrence. Toutefois, ce montant que paie Sa Majesté, le cas échéant, ne doit pas excéder le montant que l'Entrepreneur aurait été tenu de verser au réclamant si les dispositions des lois relatives aux privilèges dans les provinces et territoires ou, dans le cas de la province de Québec, de la loi à cet effet dans le Code civil, avaient été applicables aux travaux. Le réclamant n'a pas à respecter les dispositions des lois relatives aux privilèges qui établissent les démarches à suivre au moyen d'avis, d'enregistrements ou d'autre façon, comme il aurait pu être nécessaire de le faire pour conserver ou valider toute réclamation à l'égard de liens émanant du réclamant.

42.2 Sa Majesté n'effectue pas de paiement tel qu'il est décrit au paragraphe CG42.1 à moins que le réclamant lui remette :

42.2.1 un jugement ou une ordonnance exécutoire d'un tribunal compétent établissant le montant qu'aurait eu à verser l'Entrepreneur au réclamant en vertu des dispositions de la loi provinciale ou territoriale relative aux privilèges pertinente ou, dans le cas de la province de Québec, de la loi à cet effet dans le Code civil, si ces lois s'appliquaient aux travaux, ou

42.2.2 une sentence arbitrale définitive et exécutoire établissant le montant qu'aurait eu à verser l'Entrepreneur au réclamant en vertu des dispositions de la loi provinciale ou territoriale relative aux privilèges pertinente ou, dans le cas de la province de Québec, de la loi à cet effet dans le Code civil, si ces lois s'appliquaient aux travaux; ou

42.2.3 le consentement de l'Entrepreneur autorisant le paiement.

Pour déterminer les droits du réclamant en vertu des alinéas CG42.2.1 et CG42.2.2, l'avis exigé au paragraphe CG42.8 sera réputé remplacer l'enregistrement ou la prestation d'un avis après l'achèvement des travaux exigé par les lois applicables, et aucune réclamation ne sera réputée être

expirée, annulée ou non exécutoire parce que le réclamant n'a pas intenté de poursuites dans les délais prescrits par la loi applicable.

- 42.3 Lorsqu'il accepte d'exécuter un Contrat, l'Entrepreneur est réputée avoir consenti de soumettre à l'arbitrage obligatoire, à la demande d'un réclamant, toutes les questions auxquelles il faut répondre pour déterminer si le réclamant a droit au paiement conformément aux dispositions du paragraphe CG42.1. Les parties à l'arbitrage seront, entre autres, le sous-traitant à qui le réclamant a fourni des matériaux ou de l'équipement ou pour qui il a effectué du travail, si le sous-traitant le désire. L'État ne constitue pas une partie à l'arbitrage et, à moins d'une entente contraire entre l'Entrepreneur et le réclamant, l'arbitrage se déroulera conformément à la loi provinciale ou territoriale régissant l'arbitrage applicable dans la province ou le territoire où les travaux sont exécutés.
- 42.4 Une paiement effectuée en conformité du paragraphe CG42.1 comporte quittance de l'obligation de Sa Majesté envers l'Entrepreneur sous le contrat, jusqu'à concurrence du montant payé et peut être déduit d'un montant dû à l'Entrepreneur en vertu du Contrat.
- 42.5 Dans la mesure où les circonstances entourant l'exécution des travaux pour le compte de Sa Majesté le permettent, l'Entrepreneur se conforme à toutes les lois en vigueur dans la province ou le territoire où les travaux sont exécutés quant aux périodes de paiement, aux retenus obligatoires, à la création et à la mise en vigueur de lois concernant les privilèges des fournisseurs ou des constructeurs ou de lois semblables ou, s'il s'agit de la province de Québec, aux dispositions de la loi qui concerne les privilèges.
- 42.6 L'Entrepreneur acquitte toutes ses obligations légales et fait droit à toutes les réclamations légales qui lui sont adressées en conséquence de l'exécution des travaux, au moins aussi souvent que le Contrat oblige Sa Majesté à acquitter ses obligations envers l'Entrepreneur.
- 42.7 Sur demande du représentant ministériel, l'Entrepreneur fait une déclaration attestant de l'existence et de l'état de toutes les obligations et réclamations mentionnées au paragraphe CG42.6.
- 42.8 Le paragraphe CG42.1 ne s'applique qu'aux réclamations et aux obligations :
- 42.8.1 pour lesquelles le représentant ministériel a reçu un avis par écrit avant qu'un paiement n'ait été effectué à l'Entrepreneur conformément au paragraphe MP4.10 et dans les 120 jours suivant la date à laquelle le réclamant :
- 42.8.1.1 aurait dû être payé en totalité conformément au contrat qui le lie à l'Entrepreneur ou à un sous-traitant, s'il s'agit d'une réclamation pour des deniers dont il est légalement requis qu'ils soient retenus du réclamant; ou
- 42.8.1.2 s'est acquitté des derniers services ou travaux ou a fourni les derniers matériaux exigés par le contrat qui le lie à l'Entrepreneur ou à un sous-traitant, s'il ne s'agit pas d'une réclamation mentionnée au sous-alinéa CG42.8.1.1; et
- 42.8.2 pour lesquelles les procédures visant à établir les droits à un paiement, conformément au paragraphe CG42.2, ont commencé dans l'année suivant la date à laquelle l'avis mentionné à l'alinéa CG42.8.1 a été reçu par le représentant ministériel; et

l'avis exige à l'alinéa CG42.8.1 doit faire état du montant réclamé et du principal responsable selon le Contrat.

- 42.9 Sur réception d'un avis de réclamation en vertu de l'alinéa CG42.8.1, Sa Majesté peut retenir de tout montant dû et payable à l'Entrepreneur en vertu du Contrat un partie ou la totalité du montant de la réclamation.
- 42.10 Le représentant ministériel doit aviser l'Entrepreneur par écrit de la réception de toute réclamation mentionné à l'alinéa CG42.8.1 et de l'intention de Sa Majesté de retenir des fonds conformément au paragraphe CG42.9, et l'Entrepreneur peut, à tout moment par la suite et jusqu'à ce que le paiement soit effectué au réclamant, déposer, auprès de Sa Majesté, une garantie acceptable par Sa Majesté dont le montant est équivalent à la valeur de la réclamation. L'avis d'un tel dépôt doit être reçu par le représentant ministériel et, sur réception d'une telle garantie, Sa Majesté doit dégager à l'intention de l'Entrepreneur tous les fonds qui auraient été payables autrement à l'Entrepreneur et qui ont été retenus conformément aux dispositions du paragraphe CG42.9 à l'égard de la réclamation d'un réclamant pour laquelle la garantie a été déposée.

CG43 Dépôt de garantie – Confiscation ou remise

- 43.1 Si :
- 43.1.1 les travaux sont retirés à l'Entrepreneur conformément à l'article CG38;
 - 43.1.2 le Contrat est résilié en vertu de l'article CG41; ou
 - 43.1.3 l'Entrepreneur a violé ou n'a pas rempli ses engagements en vertu du Contrat;
- Sa Majesté peut s'approprier le dépôt de garantie, s'il en est.
- 43.2 Si Sa Majesté s'approprie le dépôt de garantie conformément au paragraphe CG43.1, le montant obtenu en l'occurrence est censé être une dette payable à l'Entrepreneur par Sa Majesté en vertu du Contrat.
- 43.3 Tout solde du montant mentionné au paragraphe CG43.2, s'il en est, après paiement de toutes pertes dommages ou réclamations de Sa Majesté ou quelqu'un autre, sera payé par Sa Majesté à l'Entrepreneur si, dans l'opinion du représentant ministériel, il n'est pas requis pour les fins du Contrat.

CG44 Certificats du représentant ministériel

- 44.1 Le jour :
- 44.1.1 où les travaux sont achevés; et
 - 44.1.2 où l'Entrepreneur s'est conformé au Contrat et à tous les ordres et directives donnés conformément au Contrat;

à la satisfaction du représentant ministériel, le représentant ministériel délivre à l'Entrepreneur un Certificat définitif d'achèvement.

- 44.2 Si le représentant ministériel est convaincu que les travaux sont suffisamment achevés, il peut, à tout moment avant la délivrance d'un Certificat définitif d'achèvement mentionné au paragraphe CG44.1 délivrer à l'Entrepreneur un Certificat provisoire d'achèvement, et :
- 44.2.1 aux fins du paragraphe CG44.2, les travaux seront jugés suffisamment achevés
- 44.2.1.1 lorsqu'une partie considérable ou la totalité des travaux visés par le Contrat sont, de l'avis du représentant ministériel, prêts à être utilisés par Sa Majesté ou sont utilisés aux fins prévues; et
- 44.2.1.2 lorsque les travaux qui restent à effectuer en vertu du Contrat peuvent, de l'avis du représentant ministériel, être achevés ou rectifiés à un coût n'excédant pas
- 44.2.1.2.1 -3 p. 100 des premiers 500 000 \$; et
- 44.2.1.2.2 -2 p 100 des prochains 500 000 \$; et
- 44.2.1.2.3 -1 p. 100 du reste
- de la valeur du Contrat au moment du calcul de ce coût.
- 44.3 Aux fins uniquement du sous-alinéa 44.2.1.2, lorsque les travaux ou une partie considérable des travaux sont prêts à être utilisés ou sont utilisés aux fins prévues et que le reste ou une partie des travaux ne peut être achevé pour des raisons indépendantes de la volonté de l'Entrepreneur ou, lorsque le représentant ministériel et l'Entrepreneur conviennent de ne pas achever les travaux dans les délais prescrits, le coût de la partie des travaux que l'Entrepreneur n'a pu terminer pour des raisons indépendantes de sa volonté ou que le représentant ministériel et l'Entrepreneur ont convenu de ne pas terminer dans les délais précisés sera déduit de la valeur du contrat mentionnée au sous-alinéa CG44.2.1.2 et ledit coût ne fera pas partie du coût des travaux qui restent à effectuer aux fins de la détermination de l'achèvement réel.
- 44.4 Le Certificat provisoire d'achèvement mentionné au paragraphe CG44.2 doit décrire les parties des travaux qui n'ont pas été achevées à la satisfaction du représentant ministériel et préciser tout ce que l'Entrepreneur doit faire :
- 44.4.1 avant que le Certificat définitif d'achèvement mentionné au paragraphe CG44.1 puisse être délivré; et
- 44.4.2 avant le début de la période de 12 mois mentionnée au paragraphe CG32.1.2 pour lesdites parties et toutes autres choses.
- 44.5 Le représentant ministériel peut, en plus des points indiqués dans le Certificat provisoire d'achèvement mentionné au paragraphe CG44.2, obliger l'Entrepreneur à rectifier toutes autres parties des travaux qui n'ont pas été achevées à sa satisfaction et faire effectuer toutes autres choses nécessaires pour l'achèvement satisfaisant des travaux.

- 44.6 Si le Contrat ou l'une de ses parties a fait l'objet d'une Entente à prix unitaire, le représentant ministériel mesure et consigne dans un registre les quantités de travail exécuté d'outillage fourni par l'Entrepreneur et de matériaux utilisés pour l'exécution des travaux, et informe, sur demande, l'Entrepreneur au sujet de ces mesurages.
- 44.7 L'Entrepreneur aide le représentant ministériel et coopère avec lui dans l'exécution des tâches précisées au paragraphe CG44.6 et a le droit de prendre connaissance de tout registre tenu par le représentant ministériel suivant le paragraphe CG44.6.
- 44.8 Une fois que le représentant ministériel a délivré le Certificat définitif d'achèvement mentionné au paragraphe CG44.1, il doit, si le paragraphe CG44.6 s'applique, délivrer un Certificat définitif de mesurage.
- 44.9 Le Certificat définitif de mesurage mentionné au paragraphe CG44.8 :
- 44.9.1 indique le total des mesurages des quantités mentionnées au paragraphe CG44.6, et
- 44.9.2 lie de façon péremptoire Sa Majesté et l'Entrepreneur quant aux mesurages des quantités qui y sont consignées.

CG45 Remise du dépôt de garantie

- 45.1 Après la délivrance du Certificat provisoire d'achèvement mentionné au paragraphe CG44.2 et à condition que l'Entrepreneur n'ait pas violé ses engagements en vertu du Contrat ou omis de les remplir, Sa Majesté retourne à l'Entrepreneur la totalité ou partie du dépôt de garantie, s'il en est, qui de l'avis du représentant ministériel, n'est pas requise aux fins du Contrat.
- 45.2 Au moment de la délivrance du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, Sa Majesté retourne à l'Entrepreneur tout le solde du dépôt de sécurité, sauf stipulation contraire du Contrat.
- 45.3 Si le dépôt de garantie a été versé au Trésor, Sa Majesté doit payer à l'Entrepreneur l'intérêt sur ledit dépôt à un taux établi de temps à autre en vertu du paragraphe 21(2) de la Loi sur la gestion des finances publiques.

CG46 Précision du sens des expressions figurant aux articles CG47 à CG50

- 46.1 Dans les articles CG47 à CG50 :
- 46.1.1 l'expression « Tableau des prix unitaires » signifie le tableau figurant dans les Articles de convention, et
- 46.1.2 l'expression « outillage » ne comprend pas les outils habituellement fournis par les hommes de métier dans l'exercice de leurs fonctions.

CG47 Additions ou modifications au Tableau des prix unitaires

- 47.1 Le représentant ministériel et l'Entrepreneur peuvent convenir par écrit, lorsqu'une Entente à prix unitaire s'applique au Contrat ou à l'une de ses parties :
- 47.1.1 d'ajouter au Tableau des prix unitaires des catégories de travail, d'outillage ou de matériaux, des unités de mesurage, de prix par unité et des estimations de quantités lorsque certains travaux, outillage et matériaux devant apparaître dans le Certificat définitif de mesurage mentionné au paragraphe CG44.8 ne figurent dans aucune des catégories de travail, d'outillage ou de matériaux établies au Tableau des prix unitaires; ou
 - 47.1.2 sous réserve des paragraphes CG47.2 et CG47.3, de modifier le prix par unité établi au Tableau des prix unitaires à l'égard d'une quelconque catégorie de travail, d'outillage ou de matériaux y figurant, lorsqu'une quantité a été estimée à l'égard de cette catégorie de travail, d'outillage ou de matériaux, et que le Certificat définitif de mesurage mentionné au paragraphe CG44.8 indique ou est susceptible d'indiquer que la quantité totale de cette catégorie de travail exécuté, d'outillage fourni ou de matériaux utilisés par l'Entrepreneur, pour l'exécution des travaux, est :
 - 47.1.2.1 inférieur à 85% de la quantité estimée; ou
 - 47.1.2.2 supérieure à 115% de la quantité estimée.
- 47.2 Le coût total d'un article figurant au Tableau des prix unitaires qui a été modifié conformément au sous-alinéa 47.1.2.1 ne doit, en aucun cas, excéder le montant qui aurait été payable à l'Entrepreneur si la quantité totale estimative de travail avait été exécutée, la quantité totale estimative d'outillage avait été fournie ou la quantité totale estimative de matériaux, utilisée.
- 47.3 Toute modification rendue nécessaire par le sous-alinéa CG47.1.2.2 ne s'appliquera qu'aux quantités supérieures à 115%.
- 47.4 Si le représentant ministériel et l'Entrepreneur ne s'entendent pas suivant le paragraphe CG47.1, le représentant ministériel détermine la catégorie et l'unité de mesurage du travail, de l'outillage et des matériaux et, sous réserve des paragraphes CG47.2 et CG47.3, le prix par unité est déterminé conformément à l'article CG50.

CG48 Établissement du coût – Tableau des prix unitaires

- 48.1 Chaque fois qu'il est nécessaire, aux fins du Contrat, d'établir le coût du travail, de l'outillage et des matériaux, on multiplie la quantité de ce travail de cet outillage ou de ces matériaux, exprimée par l'unité énoncée à la colonne 3 du Tableau des prix unitaires, par le prix énoncé en regard de cette unité à la colonne 5 du Tableau des prix unitaires.

CG49 Établissement du coût – Négociation

- 49.1 Si le mode d'établissement du coût prévu à l'article CG48 ne peut être utilisé parce que le genre ou la catégorie de travail, d'outillage et de matériaux en cause ne figurent pas au Tableau des prix unitaires, le coût du travail, de l'outillage ou des matériaux, aux fins du Contrat est le montant

convenu de temps à autre entre l'Entrepreneur et le représentant ministériel.

- 49.2 Aux fins du paragraphe CG49.1, l'Entrepreneur remet au représentant ministériel lorsque ce dernier le requiert, tout renseignement nécessaire sur ce qu'il lui en coûte en travail, outillage et matériaux mentionnés au paragraphe CG49.1.

CG50 Établissement du coût en cas d'échec des négociations

- 50.1 Si l'on ne parvient pas à établir le coût du travail, de l'outillage et des matériaux conformément aux méthodes prévues aux articles CG47, CG48 ou CG49, pour les fins mentionnées dans ceux-ci, le coût sera égal à l'ensemble de :

- 50.1.1 tous les montants justes et raisonnables effectivement dépensés ou légalement payables par l'Entrepreneur pour le travail, l'outillage et les matériaux couverts par une des catégories de dépenses prévues au paragraphe CG50.2, qui sont directement attribuables à l'exécution du Contrat;
- 50.1.2 une somme égale à 10% du total des dépenses de l'Entrepreneur mentionnées à l'alinéa CG50.1.1, représentant une indemnité pour profit et pour tous les autres coûts et dépenses, incluant les frais de financement et les intérêts, les frais généraux, dépenses du siège social, et tous autres frais ou dépenses, mais non les coûts et dépenses mentionnés à l'alinéa CG50.1.1 ou CG50.1.3 ou pour une catégorie mentionnée au paragraphe CG50.2;
- 50.1.3 l'intérêt sur les coûts déterminés en vertu des alinéas CG50.1.1 et CG50.1.2, intérêt qui sera calculé conformément à l'article MP9,

pourvu que le coût total d'un article figurant au Tableau des prix unitaires, auquel s'appliquent les dispositions de l'alinéa CG47.1.2.1, n'est pas supérieur au montant qui aurait été payable à l'Entrepreneur si la quantité totale dudit article aurait été effectivement produite, utilisée ou fournie.

- 50.2 Aux fins de l'alinéa CG50.1.1, les catégories de dépenses admissibles dans l'établissement du coût du travail, de l'outillage et des matériaux, sont :
- 50.2.1 les paiements faits aux sous-entrepreneurs;
- 50.2.2 les traitements, salaires et frais de voyage versés aux employés de l'Entrepreneur affectés, proprement dit, à l'exécution des travaux, à l'exception des traitements, salaires, gratifications, frais de subsistance et de voyage des employés de l'Entrepreneur travaillant généralement au siège social ou à un bureau général de l'Entrepreneur, à moins que lesdits employés ne soient affectés à l'emplacement des travaux avec la approbation du représentant ministériel;
- 50.2.3 les cotisations exigibles en vertu d'un texte statutaire relativement aux indemnités des accidents du travail, à l'assurance-chômage, au régime de retraite et aux congés rémunérés;
- 50.2.4 les frais de location d'outillage ou un montant équivalent aux frais de location si l'outillage appartient à l'Entrepreneur qui était nécessaire et qui a été utilisé pour

l'exécution des travaux, à condition que lesdits frais ou la somme équivalente soient raisonnables et que l'utilisation dudit outillage ait été approuvée par le représentant ministériel;

- 50.2.5 les frais d'entretien et de fonctionnement de l'outillage nécessaire à l'exécution des travaux et des frais de réparation à tel outillage qui, de l'avis du représentant ministériel, sont nécessaires à la bonne exécution du Contrat, à l'exclusion de toutes réparations provenant de défauts existant avant l'affectation de l'outillage aux travaux;
- 50.2.6 les paiements relatifs aux matériaux nécessaires et incorporés aux travaux, ou nécessaires à l'exécution du Contrat et utilisés à cette fin; et
- 50.2.7 les paiements relatifs à la présentation, à la livraison, à l'utilisation, à l'érection, à l'installation, à l'inspection, à la protection et à l'enlèvement de l'outillage et des matériaux nécessaires à l'exécution du Contrat et utilisés à cette fin; et
- 50.2.8 tout autre paiement fait par l'Entrepreneur avec l'approbation du représentant ministériel et nécessaire à l'exécution du Contrat.

CG51 Registres à tenir par l'Entrepreneur

- 51.1 L'Entrepreneur :
 - 51.1.1 tient des registres complets du coût estimatif et réel des travaux, des appels d'offres, des prix cotés, des contrats, de la correspondance, des factures, des reçus et des pièces justificative s'y rapportant;
 - 51.1.2 met à la disposition du Ministre et du sous-receveur général du Canada ou des personnes qu'ils délèguent pour vérification et inspection tous les documents mentionnés à l'alinéa CG51.1.1;
 - 51.1.3 permet à toutes personnes mentionnées à l'alinéa 51.1.2 de faire des copies ou extraits de tous registres et documents mentionnés à l'alinéa CG51.1.1; et
 - 51.1.4 fournit aux personnes mentionnées à l'alinéa CG51.1.2 tous les renseignements qu'elles peuvent exiger de temps à autre au sujet de ces registres et documents.
- 51.2 Les registres tenus par l'Entrepreneur conformément à l'alinéa CG51.1.1, sont conservés intact pendant deux ans à compter de la date de la délivrance du Certificat définitif d'achèvement mentionné au paragraphe CG44.1, ou jusqu'à l'expiration de toute autre période que le Ministre peut fixer.
- 51.3 L'Entrepreneur oblige tous sous-entrepreneurs, et toutes autres personnes qu'il contrôle directement ou indirectement ou qui lui sont affiliés, de même que toutes personnes qui contrôlent l'Entrepreneur directement ou indirectement, à se conformer aux paragraphes CG51.1 et CG51.2 comme s'ils étaient l'Entrepreneur.

CG52 Conflits d'intérêts

- 52.1 Le présent Contrat stipule qu'aucun ancien titulaire de charge publique qui ne se conforme pas au Code régissant la conduite des titulaires de charge publique en ce qui concerne les conflits d'intérêts et l'après-mandat ne peut retirer des avantages directs du présent Contrat.

CG53 Situation de l'Entrepreneur

- 53.1 L'Entrepreneur sera retenu en vertu du Contrat à titre d'entrepreneur indépendant.
- 53.2 L'Entrepreneur et tout employé dudit entrepreneur n'est pas retenu en vertu du Contrat à titre d'employé, d'agent ou de mandataire de Sa Majesté.
- 53.3 Aux fins des paragraphes CG53.1 et CG53.2, l'Entrepreneur sera à lui seul responsable de tous les paiements et de toutes les retenues exigées par la loi, y compris ceux exigés par le Régime de pensions du Canada, le Régime des rentes du Québec, l'assurance-chômage, les accidents du travail ou l'impôt sur le revenu.



CONDITIONS GÉNÉRALES

- CA 1 Preuve du contrat d'assurance**
- CA 2 Gestion des risques**
- CA 3 Paiement de franchise**
- CA 4 Assurance d'assurance**

EXIGENCES DE GARANTIES D'ASSURANCE

- EGA 1 Assuré**
- EGA 2 Période d'assurance**
- EGA 3 Preuve du contrat d'assurance**
- EGA 4 Avis**

ASSURANCE DE LA RESPONSABILITÉ CIVILE DES ENTREPRISES

- ARC 1 Portée de l'assurance**
- ARC 2 Garanties/Dispositions**
- ARC 3 Risques additionnels**
- ARC 4 Indemnité d'assurance**
- ARC 5 Franchise**

ASSURANCE DES CHANTIERS – RISQUES D'INSTALLATION – TOUS RISQUES

- AC 1 Portée de l'assurance**
- AC 2 Biens assurés**
- AC 3 Indemnités d'assurance**
- AC 4 Montant d'assurance**
- AC 5 Franchise**
- AC 6 Subrogation**
- AC 7 Exclusion**

ATTESTATION D'ASSURANCE DE L'ASSUREUR



CONDITIONS GÉNÉRALES

CA 1 Preuve du contrat d'assurance (02/12/03)

Dans un délai de trente (30) jours après l'acceptation de la soumission de l'entrepreneur, ce dernier, à moins d'avis contraire par écrit de l'agent d'approvisionnement, doit remettre à l'agent d'approvisionnement, l'Attestation d'assurance d'un assureur dans la forme apparaissant dans le présent document et, si demandé par l'agent d'approvisionnement, remettre à ce dernier les originaux ou les copies certifiées conformes de tous les contrats d'assurance auxquels l'entrepreneur a souscrit conformément aux Exigences des garanties d'assurance décrites ci-après.

CA 2 Gestion des risques (01/10/94)

Les dispositions des Exigences des garanties d'assurance des présentes n'ont pas pour but de couvrir toutes les obligations de l'entrepreneur en vertu de l'article CG8 des Conditions générales « C » du marché. L'entrepreneur est libre, à condition d'en assumer le coût, de prendre des mesures additionnelles de gestion des risques ou des garanties d'assurance complémentaires qu'il juge nécessaire pour remplir ses obligations conformément à l'article CG8.

CA 3 Paiement de franchise (01/10/94)

L'entrepreneur doit assumer le paiement de toutes sommes d'argent en règlement d'un sinistre, jusqu'à concurrence de la franchise.

CA 4 Assurance d'assurance (02/12/03)

L'entrepreneur a déclaré qu'il détient une assurance de responsabilité civile appropriée et habituelle qui est en vigueur conformément aux présentes Conditions d'assurance et il a garanti qu'il obtiendra, en temps opportune et avant le commencement des travaux, l'assurance de biens appropriée et habituelle conformément aux présentes Conditions d'assurance et qu'en outre il maintiendra en vigueur toutes les polices d'assurance requises conformément aux présentes Conditions d'assurance.

EXIGENCES DE GARANTIES D'ASSURANCE

PARTIE I

EXIGENCES GÉNÉRALES D'ASSURANCE (EGA)

EGA 1 Assuré (02/12/03)

Chaque contrat d'assurance doit assurer l'entrepreneur et doit inclure à titre d'Assuré dénommé additionnel, Sa Majesté la Reine du chef du Canada, représentée par le Conseil national de recherches Canada.



**EGA 2 Période d'assurance
(02/12/03)**

Moins d'avis contraire par écrit de l'agent d'approvisionnement ou d'indication contraire ailleurs dans les présentes Conditions d'assurance, les contrats d'assurance exigés dans les présentes doivent prendre effet le jour de l'attribution du marché et demeurer en vigueur jusqu'au jour de la délivrance du Certificat définitif d'achèvement du représentant ministériel.

**EGA 3 Preuve du contrat d'assurance
(01/10/94)**

Dans un délai de vingt-cinq (25) jours après l'acceptation de la soumission de l'entrepreneur, l'assureur, à moins d'avis contraire écrit de l'entrepreneur, doit remettre à l'entrepreneur l'Attestation d'assurance d'un assureur dans la forme apparaissant dans le présent document et, si demandé, les originaux ou les copies certifiées conformes de tous les contrats d'assurance auxquels l'entrepreneur a souscrit conformément aux présentes Exigences de présentes garanties d'assurance.

**EGA 4 Avis
(01/10/94)**

Chaque contrat d'assurance doit renfermer une disposition selon laquelle trente (30) jours avant de procéder à toute modification importante visant la garantie d'assurance, ou à l'annulation de ladite garantie d'assurance, un avis par écrit doit être envoyé par l'assureur à Sa Majesté. Tout avis de cette nature que reçoit l'entrepreneur doit être transmis sans délai à Sa Majesté.

**PARTIE II
ASSURANCE DE LA RESPONSABILITÉ CIVILE DES ENTREPRISES**

**ARC 1 Portée de l'assurance
(01/10/94)**

Le contrat d'assurance doit être établi sur un formulaire similaire à celui connu et désigné dans l'industrie de l'assurance sous l'appellation Assurance de la responsabilité civile des entreprises (base d'événement) – BAC 2100, et doit accorder un montant de garantie d'au moins 2 000 000 \$ (tous dommages confondus) pour des dommages corporels et matériels imputables au même événement ou à une série d'événements ayant la même origine. Les frais de justice ou autres déboursés de défense par suite de sinistre ou de réclamation ne viendront pas en déduction du montant de garantie.

**ARC 2 Garanties/Dispositions
(01/10/94)**

Le contrat d'assurance doit inclure les garanties/dispositions suivantes sans toutefois nécessairement s'y limiter :

- 2.1 La responsabilité découlant de la propriété, de l'existence de l'entretien ou de l'utilisation de lieux par l'entrepreneur et les activités nécessaires ou connexes à l'exécution du présent contrat.
- 2.2 L'extension de la garantie « Dommages matériels et/ou privation de jouissance ».



- 2.3 L'enlèvement ou l'affaiblissement d'un support soutenant des bâtiments ou terrains, que ce support soit naturel ou non.
- 2.4 La responsabilité découlant des appareils de levage et des monte-charge (y compris les escaliers roulants).
- 2.5 La responsabilité civile indirecte des entrepreneurs.
- 2.6 Les responsabilités contractuelles et assumées en vertu du présent contrat.
- 2.7 La responsabilité civile découlant des risques après travaux. En regard de la présente garantie, ainsi que toutes les autres garanties de cette Partie II des présentes Conditions d'assurance, l'assurance doit demeurer en vigueur pendant au moins un (1) an à partir de la date de délivrance du Certificat d'achèvement du représentant ministériel.
- 2.8 Responsabilité réciproque – La clause doit être rédigée comme suit :

Responsabilité réciproque – L'assurance telle que garantie par le présent contrat s'applique à toute demande d'indemnité faite à ou à toute action intentée contre n'importe quel assuré par n'importe quel autre assuré. La garantie d'assurance s'applique de la même façon et dans la même mesure que si un contrat distinct avait été établi à chacun d'eux. L'inclusion de plus d'un assuré n'augmente pas le montant de garantie de l'assureur.

- 2.9 Individualité des intérêts – La clause doit être rédigée comme suit :

Individualité des intérêts – La présente assurance, sous réserve des montants de garantie, s'applique séparément à chaque assuré de la même façon et dans la même mesure que si un contrat distinct avait été établi à chacun d'eux. L'inclusion de plus d'un assuré n'augmente pas le montant de garantie de l'assureur.

ARC 3 Risques additionnels (02/12/03)

Le contrat d'assurance doit couvrir ou être amendé pour couvrir les risques suivants, si l'entreprise y est soumise :

- 3.1 Dynamitage;
- 3.2 Battage de pieux et travail par caisson;
- 3.3 Reprise en sous-œuvre;
- 3.4 Risques associés aux activités de l'entrepreneur dans un aéroport en service;
- 3.5 Contamination par radioactivité par suite de l'utilisation d'isotopes commerciaux;
- 3.6 Endommagement à la partie d'un bâtiment existant hors de la portée directe d'un marché de rénovation, d'addition ou d'installation;
- 3.7 Risques maritimes reliés à la construction de jetés, quais et docks.



**ARC 4 Indemnités d'assurance
(01/10/94)**

Toute indemnité en vertu de la présente assurance est habituellement versée à un tiers réclamant.

**ARC 5 Franchise
(02/12/03)**

Le contrat d'assurance doit être établie avec une franchise d'au plus 10 000 \$ événement quant aux sinistres causés par dommages matériels.

**PART III
ASSURANCE DES CHANTIERS – RISQUES D'INSTALLATION – TOUS RISQUES**

**AC 1 Portée de l'assurance
(01/10/94)**

Le contrat d'assurance doit être établi pour assurer l'entreprise sur un base « Tous risques » donnant un couverture d'assurance identique à celle qui est fournie par les formulaires connues et désignées dans l'industrie des assurances sous les noms de l' « Assurances des Chantiers – Formule globale » ou « Risques d'installation – Tous Risques ».

**AC 2 Biens assurés
(01/10/94)**

Les biens assurés doivent comprendre :

- 2.1 les travaux, ainsi que tous les biens, équipement et matériaux devant être incorporés à l'entreprise achevée à l'endroit du projet, avant, durant et après leur installation, érection ou construction, y compris les essais;
- 2.2 les frais de déblaiement du chantier occasionnés par un sinistre couvert y ayant laissé des débris provenant de biens couverts par la présente assurance, y compris la démolition des biens endommagés, l'enlèvement de la glace et l'assèchement.

**AC 3 Indemnité d'assurance
(01/10/94)**

- 3.1 Toutes indemnités en vertu du contrat d'assurance doit être payées conformément à l'article CG28 des Conditions générales « C » du contrat.
- 3.2 Le contrat d'assurance doit stipuler que toute indemnité en vertu d'icelle doit être payé à Sa Majesté ou selon les directives du Ministre.
- 3.3 L'entrepreneur doit faire toutes choses et exécuter tous documents requis pour le paiement de l'indemnité d'assurance.

AC 4 Montant d'assurance



(01/10/94)

Le montant de l'assurance doit égalier au moins la somme de la valeur du contrat plus la valeur déclarée (s'il y a lieu) dans les documents du marché de tout le matériel et équipement fourni par Sa Majesté sur le chantier pour être incorporé à l'entreprise achevée et en faire partie.

AC 5 Franchise
(02/12/94)

La police doit être établie avec une franchise d'au plus 10 000 \$.

AC 6 Subrogation
(01/10/94)

La clause suivante doit être incluse dans le contrat d'assurance :

« Tous droits de subrogation ou transfert de droits sont par les présentes abandonnées contre toutes les personnes physiques ou morales ayant droit au bénéfice de la présente assurance. »

AC 7 Exclusion
(01/10/94)

Le contrat d'assurance peut comporter les exclusions normales sous réserve des exceptions suivantes :

- 7.1 Peuvent être exclus les frais inhérents à la bonne exécution des travaux, et rendus nécessaires par des défauts dans les matériaux, la main d'œuvre ou la conception, l'assurance produisant néanmoins ses effets en ce qui concerne les sinistres entraînés par voie de conséquence.
- 7.2 La perte ou les dommages causés par la contamination de matériaux radioactifs, sauf la perte ou les dommages résultant de l'utilisation d'isotopes commerciaux pour la mesure, l'inspection, le contrôle de la qualité, la radiographie ou la photographie industriels.
- 7.3 La mise en service et l'occupation de l'entreprise, en totalité ou en partie, doivent être permis pour les fins auxquels l'entreprise est destiné à son achèvement.



ATTESTATION D'ASSURANCE DE L'ASSUREUR
(À ÊTRE COMPLÈTE PAR L'ASSUREUR (NON PAR LE COURTIER) ET LIVRÉE AU CONSEIL NATIONAL DE RECHERCHES CANADA DANS LES TRENTE JOURS SUIVANT L'ACCEPTATION DE LA SOUMISSION)

MARCHÉ

DESCRIPTION DES TRAVAUX	NUMÉRO DE MARCHÉ	DATE D'ADJUDICATION
ENDROIT		

ASSUREUR

NOM
ADRESSE

COURTIER

NOM
ADRESSE

ASSURÉ

NOM DE L'ENTREPRENEUR
ADRESSE

ASSURÉ ADDITIONNEL

SA MAJESTÉ LA REINE DU CHEF DU CANADA REPRÉSENTÉE PAR LE CONSEIL NATIONAL DE RECHERCHES CANADA
--

LE PRÉSENT DOCUMENT ATTESTE QUE LES POLICES D'ASSURANCE SUIVANTES SONT PRÉSENTEMENT EN VIGUEUR ET COUVRENT TOUTES LES ACTIVITÉS DE L'ASSURÉ, EN FONCTION DU MARCHÉ DU CONSEIL NATIONAL DE RECHERCHES CANADA CONCLU ENTRE L'ASSURÉ DÉNOMMÉ ET LE CONSEIL NATIONAL DE RECHERCHES CANADA SELON LES CONDITIONS D'ASSURANCE « E ».

POLICE					
GENRE	NUMÉRO	DATE D'EFFET	DATE D'EXPIRATION	LIMITES DE GARANTIE	FRANCHISE
RESPONSABILITÉ CIVILE DES ENTREPRISES					
ASSURANCE DES CHANTIERS « TOUS RISQUES »					
RISQUES D'INSTALLATION « TOUS RISQUES »					

L'ASSUREUR CONVIENT DE DONNER UN PRÉAVIS DE TRENTE JOURS AU CONSEIL NATIONAL DE RECHERCHES CANADA EN CAS DE TOUTE MODIFICATION VISANT LA GARANTIE D'ASSURANCE OU LES CONDITIONS OU DE L'ANNULATION DE N'IMPORTE QUELLE POLICE OU GARANTIE QUI FONT PARTIE INTÉGRANTE DU CONTRAT.

NOM DU CADRE OU DE LA PERSONNE AUTORISÉE	SIGNATURE	DATE :
		NUMÉRO DE TÉLÉPHONE :



CGC1 Obligation de fournir une garantie de contrat

- 1.1 L'Entrepreneur doit, à ses propres frais, fournir une ou plusieurs des garanties de contrat mentionnées à l'article CGC2.
- 1.2 L'Entrepreneur doit fournir au représentant ministériel la garantie de contrat mentionnée au paragraphe CGC1.1 dans les 14 jours suivant la date à laquelle l'Entrepreneur reçoit un avis lui signifiant l'acceptation de sa soumission par Sa Majesté.

CGC2 Types et montants acceptables de garanties de contrat

- 2.1 L'Entrepreneur fournit au représentant ministériel conformément à l'article CGC1 :
 - 2.1.1 un cautionnement d'exécution et un cautionnement pour le paiement de la main-d'œuvre et des matériaux, représentant chacun au moins 50% du montant payable indiqué dans les Articles de convention; ou
 - 2.1.2 un cautionnement pour le paiement de la main-d'œuvre et des matériaux, représentant au moins 50% du montant payable indiqué dans les Articles de convention, et un dépôt de garantie représentant :
 - 2.1.2.1 au moins 10% du montant indiqué dans les Articles de convention, si ce montant n'excède pas 250 000 \$; ou
 - 2.1.2.2 25 000 \$, plus 5% de la partie du montant du Contrat indiqué dans les Articles de convention qui excède 250 000 \$; ou
 - 2.1.3 un dépôt de garantie représentant le montant prescrit à l'alinéa CGC2.1.2, majoré d'un supplément représentant 10% du montant du Contrat indiqué dans les Articles de convention.
- 2.2 Le cautionnement d'exécution et le cautionnement pour le paiement de la main-d'œuvre et des matériaux mentionnés au paragraphe CGC2.1 doivent être dans une forme approuvée et provenir d'une compagnie dont les cautionnements sont acceptés par Sa Majesté.
- 2.3 Le montant maximum du dépôt de garantie requis en vertu de l'alinéa CGC2.1.2 ne doit pas excéder 250 000 \$, quel que soit le montant du Contrat indiqué dans les Articles de convention.
- 2.4 Le dépôt de garantie mentionné aux alinéas CGC2.1.2 et CGC2.1.3 consiste en :
 - 2.4.1 une lettre de change payable à l'ordre du receveur général du Canada et certifiée par une institution financière approuvée ou tirée par une institution financière approuvée sur son propre compte; ou
 - 2.4.2 des obligations du gouvernement du Canada ou des obligations garanties inconditionnellement quant au capital et aux intérêts par le gouvernement du Canada.
- 2.5 Aux fins du paragraphe CGC2.4 :



- 2.5.1 une lettre de change est un ordre inconditionnel donné par écrit par l'Entrepreneur à une institution financière agréée et obligeant ladite institution à verser, sur demande et à une certaine date, une certaine somme au receveur général du Canada ou à l'ordre de ce dernier; et
- 2.5.2 si une lettre de change est certifiée par une institution financière autre qu'une banque à charte, elle doit être accompagnée d'une lettre ou d'une attestation estampillée confirmant que l'institution financière appartient à au moins l'une des catégories mentionnées à l'alinéa CGC2.5.3 ;
- 2.5.3 une institution financière agréée est :
 - 2.5.3.1 une société ou institution qui est membre de l'Association canadienne des paiements,
 - 2.5.3.2 une société qui accepte des dépôts qui sont garantis par la Société d'assurance-dépôts du Canada ou la Régie de l'assurance-dépôts du Québec jusqu'au maximum permis par la loi,
 - 2.5.3.3 une caisse de crédit au sens de l'alinéa 137(6)(b) de la *Loi de l'impôt sur le revenu*,
 - 2.5.3.4 une société qui accepte du public des dépôts dont le remboursement est garanti par Sa Majesté du chef d'une province, ou
 - 2.5.3.5 la Société canadienne des postes.
- 2.5.4 les obligations mentionnées à l'alinéa CGC2.4.2 doivent être :
 - 2.5.4.1 payables au porteur ;
 - 2.5.4.2 accompagnées d'un document de transfert dûment exécuté à l'ordre du receveur général du Canada, dûment exécuté et dans la forme prescrite par le Règlement concernant les obligations intérieures du Canada; ou
 - 2.5.4.3 enregistrées quant au capital ou quant au capital et aux intérêts au nom du receveur général du Canada, conformément au Règlement concernant les obligations intérieures du Canada; et
 - 2.5.4.4 fournies à leur valeur courante sur le marché à la date du Contrat.



Contract Number / Numéro du contrat 780266
Security Classification / Classification de sécurité UNCLASSIFIED

**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 NRC	2. Branch or Directorate / Direction générale ou Direction 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 M19 Rms #318, 329B, 329C Renovation	

5. a) Will the supplier require access to Controlled Goods?
Le fournisseur aura-t-il accès à des marchandises contrôlées? No Yes
Non 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 Yes
Non 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 Yes
Non 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 Yes
Non 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 Yes
Non Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada <input checked="" type="checkbox"/>	NATO / OTAN <input type="checkbox"/>	Foreign / Étranger <input type="checkbox"/>
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7. b) Release restrictions / Restrictions relatives à la diffusion

No release restrictions Aucune restriction relative à la diffusion <input checked="" type="checkbox"/>	All NATO countries Tous les pays de l'OTAN <input type="checkbox"/>	No release restrictions Aucune restriction relative à la diffusion <input type="checkbox"/>
Not releasable À ne pas diffuser <input type="checkbox"/>		
Restricted to: / Limité à: <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays:	Restricted to: / Limité à: <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays:	Restricted to: / Limité à: <input type="checkbox"/> Specify country(ies): / Préciser le(s) pays:

7. c) Level of information / Niveau d'information

PROTECTED A PROTÉGÉ A <input type="checkbox"/>	NATO UNCLASSIFIED NATO NON CLASSIFIÉ <input type="checkbox"/>	PROTECTED A PROTÉGÉ A <input type="checkbox"/>
PROTECTED B PROTÉGÉ B <input type="checkbox"/>	NATO RESTRICTED NATO DIFFUSION RESTREINTE <input type="checkbox"/>	PROTECTED B PROTÉGÉ B <input type="checkbox"/>
PROTECTED C PROTÉGÉ C <input type="checkbox"/>	NATO CONFIDENTIAL NATO CONFIDENTIEL <input type="checkbox"/>	PROTECTED C PROTÉGÉ C <input type="checkbox"/>
CONFIDENTIAL CONFIDENTIEL <input type="checkbox"/>	NATO SECRET NATO SECRET <input type="checkbox"/>	CONFIDENTIAL CONFIDENTIEL <input type="checkbox"/>
SECRET SECRET <input type="checkbox"/>	COSMIC TOP SECRET COSMIC TRÈS SECRET <input type="checkbox"/>	SECRET SECRET <input type="checkbox"/>
TOP SECRET TRÈS SECRET <input type="checkbox"/>		TOP SECRET TRÈS SECRET <input type="checkbox"/>
TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) <input type="checkbox"/>		TOP SECRET (SIGINT) TRÈS SECRET (SIGINT) <input type="checkbox"/>



PART A (continued) / PARTIE A (suite)

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS? No / Non Yes / Oui
if Yes, indicate the level of sensitivity:
Dans l'affirmative, indiquer le niveau de sensibilité :

9. Will the supplier require access to extremely sensitive INFOSEC information or assets?
Le fournisseur aura-t-il accès à des renseignements ou à des biens INFOSEC de nature extrêmement délicate? No / Non Yes / Oui

Short Title(s) of material / Titre(s) abrégé(s) du matériel :
Document Number / Numéro du document :

PART B - PERSONNEL (SUPPLIER) / PARTIE B - PERSONNEL (FOURNISSEUR)

10. a) Personnel security screening level required / Niveau de contrôle de la sécurité du personnel requis

- | | | | |
|---|---|---|--|
| <input checked="" type="checkbox"/> RELIABILITY STATUS
COTE DE FIABILITÉ | <input type="checkbox"/> CONFIDENTIAL
CONFIDENTIEL | <input type="checkbox"/> SECRET
SECRET | <input type="checkbox"/> TOP SECRET
TRÈS SECRET |
| <input type="checkbox"/> TOP SECRET - SIGINT
TRÈS SECRET - SIGINT | <input type="checkbox"/> NATO CONFIDENTIAL
NATO CONFIDENTIEL | <input type="checkbox"/> NATO SECRET
NATO SECRET | <input type="checkbox"/> COSMIC TOP SECRET
COSMIC TRÈS SECRET |
| <input type="checkbox"/> SITE ACCESS
ACCÈS AUX EMPLACEMENTS | | | |

Special comments:

Commentaires spéciaux :

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



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			CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET
											A	B	C			
Information / Assets / Renseignements / Biens / Production																
IT Media / Support TI																
IT Link / Lien électronique																

12. a) Is the description of the work contained within this SRCL PROTECTED and/or CLASSIFIED?
La description du travail visé par la présente LVERS est-elle de nature PROTÉGÉE et/ou CLASSIFIÉE?

No / Non Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification".
Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire.

12. b) Will the documentation attached to this SRCL be PROTECTED and/or CLASSIFIED?
La documentation associée à la présente LVERS sera-t-elle PROTÉGÉE et/ou CLASSIFIÉE?

No / Non Yes / Oui

If Yes, classify this form by annotating the top and bottom in the area entitled "Security Classification" and indicate with attachments (e.g. SECRET with Attachments).
Dans l'affirmative, classifiez le présent formulaire en indiquant le niveau de sécurité dans la case intitulée « Classification de sécurité » au haut et au bas du formulaire et indiquez qu'il y a des pièces jointes (p. ex. SECRET avec des pièces jointes).



Contract Number / Numéro du contrat 780266
Security Classification / Classification de sécurité UNCLASSIFIED

PART D - AUTHORIZATION / PARTIE D - AUTORISATION

13. Organization Project Authority / Chargé de projet de l'organisme			
Name (print) - Nom (en lettres moulées) Denis Labelle		Title - Titre Construction Project Manager	Signature
Telephone No. - N° de téléphone 613-993-4923	Facsimile No. - N° de télécopieur 613-957-9828	E-mail address - Adresse courriel denis.labelle@nrc-cnrc.gc.ca	Date Nov. 9/17
14. Organization Security Authority / Responsable de la sécurité de l'organisme			
Name (print) - Nom (en lettres moulées) Richard Bramucci		Title - Titre Analyst, Security in Contracting	Signature
Telephone No. - N° de téléphone (613) 991-1093	Facsimile No. - N° de télécopieur (613) 990-0946	E-mail address - Adresse courriel richard.bramucci@nrc-cnrc.gc.ca	Date NOV 09 2017
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?			<input checked="" type="checkbox"/> No / Non <input type="checkbox"/> Yes / Oui
16. Procurement Officer / Agent d'approvisionnement			
Name (print) - Nom (en lettres moulées) 		Title - Titre Senior Proc. Officer	Signature
Telephone No. - N° de téléphone 613 991-9920	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel	Date 16-11-2017
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