



DEVIS

NO. DE SOLICITATION: 16-22051

Edifice: S-77 100 Sussex Drive, Ottawa, Ontario

PROJET: S-77, remplacement du service d'eau principale et le terrain de stationnement/réhabilitation la voie de service

NO. DE PROJET : S77-5226

Date: Juillet, 2016



DEVIS

TABLE DES MATIERES

Formulaire de soumission

Annonce Achatsetventes

Instructions aux soumissionnaires

Taxes de ventes Ontario

Compagnies de cautionnements

Articles de convention

Plans et devis **A**

Modalités de paiement **B**

Conditions générales **C**

Conditions de travail et échelle des justes salaires N/A	D
Conditions d'assurance	E
Condition de garantie du contrat	F
Liste de vérification des exigences relatives à la sécurité LVERS	G

Directions to the Ottawa Research Facilities – Sussex Drive

100 Sussex Drive
Ottawa, Ontario, Canada

NRC Steacie Institute for Molecular Sciences (NRC-SIMS)

Tel: 613-991-5419

NRC Institute for Biological Sciences (NRC-IBS)

Tel: 613-993-5812

By Road, from the OTTAWA International Airport

1. Take the AIRPORT PARKWAY
2. Drive on the AIRPORT PARKWAY as it becomes BRONSON ST
3. Turn RIGHT at LAURIER ST
4. From LAURIER ST turn LEFT on BAY ST
5. From BAY ST, turn RIGHT on WELLINGTON ST
6. Pass the Parliament buildings and turn LEFT on SUSSEX DR
7. Drive on SUSSEX DR until you see the NRC-CNRC sign at 100 Sussex, on your LEFT.

By Road, from MONTREAL RD FACILITIES

1. Drive Southwest on MONTREAL RD (REGIONAL ROUTE 34 W)
2. Turn RIGHT onto VANIER PARKWAY / REGIONAL ROUTE 19 N
3. Turn LEFT onto ST PATRICK ST (You will cross the ST PATRICK ST BRIDGE)
4. Turn RIGHT on KING EDWARD AVE/REGIONAL ROUTE 99 N
5. Take EXIT to the RIGHT to SUSSEX
6. At the LIGHT, go straight into 100 Sussex PARKING lot.





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

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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 S-77 Remplacement du service d'eau principale et le terrain de stationnement/réhabilitation la voie de service

No. de Proposition: 16-22051

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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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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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° 1 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.)

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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

Project #3924: S-77 Watermain Replacement & Parking Lot Rehabilitation

Appendix 1 – TENDER BID FORM

Cost Breakdown Information

NOTE: This Appendix must be completed and submitted with the Construction Tender Form. Contract will be awarded to the lowest total contract price.

1.1 Pricing Schedule

Contractor **MUST** provide all-inclusive cost for each of the following items of the project.

Item	Cost (excluding GST/HST) In lawful money of Canada
1. General: Mobilization, Erosion & Sediment Control Measures	\$
2. Removals	\$
3. Storm Works	\$
4. Watermain	\$
5. Curbs & Sidewalks	\$
6. Grading, Excavation, Landscaping, Grounds R-instatement & Paving	\$

7. Site Lighting & Electrical Works	\$
8. Sanitary Works (works related to drawings C04 & C05 and associated related electrical requirements as indicated on E02 & E03)	\$
9. Miscellaneous Other Related Works	\$
Total Firm Lump Sum Price:	\$

End of Appendix 1

ANNONCE ACHATSETVENTES

S-77 Remplacement du service d'eau principale et le terrain de stationnement/ réhabilitation la voie de service

Le Conseil national de recherches du Canada, 100 promenade Sussex, Ottawa, ON, a une demande pour un projet qui comprend :

Remplacement des conduits d'eau, la réparation des réseaux d'égouts pluviaux, la reconstruction du stationnement et le traitement de la décharge sanitaire.

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 Achatsetventes.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 19 juillet et le 21 juillet, 2016 à **9 :00**. Rencontrer Don Seabrook à l'édifice S-77, 100 promenade Sussex, 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 10 août, 2016 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 SOUMISSION 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: Don Seabrook
Téléphone: 613 991-9874

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 0R6, 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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Publication archivées

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 équivalant 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, paragraphes 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.-É., 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 Sampo du Japon
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.

<u>SECTION</u>	<u>TITRE</u>	<u>PAGES</u>
<u>DIVISION 00 – INFORMATION GENERALES</u>		
00 01 10	Table des Matières	2
00 01 50	List of Drawings	1
00 10 00	Directives Générales	13
00 15 45	Exigences Générales de Sécurité	6
<u>DIVISION 01 – EXIGENCES GENERALES</u>		
01 11 00	Summary of Work	4
01 29 83	Payment Procedures for Testing Laboratory Services	2
01 31 19	Project Meetings	3
01 33 00	Submittal Procedures	5
01 35 29.06	Health and Safety Requirements	4
01 35 43	Environmental Procedures	2
01 45 00	Quality Control	3
01 51 00	Temporary Utilities	2
01 52 00	Construction Facilities	4
01 71 00	Examination and Preparation	3
01 74 11	Cleaning	2
01 74 21	Construction/Demolition Waste Management and Disposal	3
01 77 00	Closeout Procedures	2
01 78 00	Closeout Submittals	8
<u>DIVISION 02 – CONDITIONS EXISTANTE</u>		
02 41 13.14	Asphalt Paving Removal	2
<u>DIVISION 03 - BETON</u>		
03 30 00	Cast-in-Place Concrete	6
<u>DIVISION 26 - ELECTRICITE</u>		
26 05 00	Common Work Results for Electrical	16
26 05 20	Wire and Box Connectors 0-1000 V	2
26 05 21	Wires and Cables (0-1000 v)	3
26 05 28	Grounding – Secondary	2
26 05 29	Hangers And Supports For Electrical Systems	2
26 05 31	Splitters, Junction, Pull Boxes And Cabinets	2
26 05 34	Conduits, Conduit Fastenings And Conduit Fittings	4
26 05 43.01	Installation Of Cables In Trenches And Ducts	2
26 12 16.01	Dry Type Transformers Up To 600v Primary	2
26 24 16.01	Panelboards Breaker Type	3
26 28 13.01	Fuses - Low Voltage	2
26 28 16.02	Moulded Case Circuit Breakers	3
26 28 23	Disconnect Switches - Fused And Non-Fused	2
26 50 00	Lighting	3

26 56 19	Roadway Lighting	2
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DIVISION 31 - TERRASSEMENTS

31 00 99	Earthwork for Minor Works	5
31 05 16	Aggregate Materials	4
31 22 16.13	Roadway Subgrade Reshaping	2
31 23 16.26	Rock Removal	2
31 23 33.01	Excavating, Trenching and Backfilling	8

DIVISION 32 – AMENAGEMENTS EXTERIEURS

32 01 90.33	Tree and Shrub Preservation	3
32 11 16.01	Granular Sub-Base	4
32 11 17	Reshaping Granular Roadbed	2
32 11 23	Aggregate Base Courses	3
32 12 13.16	Asphalt Tack Coats	3
32 12 16.02	Asphalt Paving for Building Sites	5
32 16 15	Concrete Walks, Curbs and Gutters	4
32 17 23	Pavement Markings	3
32 91 19.13	Topsoil Placement and Grading	4
32 92 23	Sodding	5

DIVISION 33 – SERVICES D'UTILITES

33 05 13	Manholes and Catch Basin Structures	4
33 05 15	Pre-Engineered Fiberglass Pump Station	9
33 06 15	Package Treatment Plant	6
33 11 16	Site Water Utility Distribution Piping	14
33 41 00	Storm Utility Drainage Piping	4
33 65 76	Direct Buried Underground Cable Ducts	3
33 71 75	Underground Electrical Service	2

ANNEXE A

Geotechnical Report

ANNEXE B

Storm Sewer at Steam Crossing

The following is a list of drawings which accompany these specifications and which form part of the Contract Documents for the Work:

ELECTRICAL

ED01 DEMOLITION
E01 LEGEND, DRAWING LIST, SCHEDULES, AND DETAILS
E02 SITE LIGHTING
E03 POWER – SEWAGE TREATMENT PLANT

CIVIL

C01 EROSION AND SEDIMENT CONTROL
C02 SITE SERVICING: WATERMAIN
C03 SITE SERVICING: STORM SEWER
C04 SITE SERVICING: SANITARY SEWER
C05 SITE SERVICING: SANITARY SEWER DETAIL
C06 GRADING
C07 GENERAL DETAILS AND NOTES
C08 WATERMAIN DETAILS

1. DESCRIPTION DES TRAVAUX

- .1 Les travaux en vertu du présent contrat porte sur le remplacement des conduites d'eau, la réparation des égouts pluviaux, réhabilitation du stationnement et l'interception et le traitement du décharge sanitaire dans l'édifice au 100, promenade Sussex, Ottawa du Conseil national de recherches.

2. DESSINS

- .1 Se reporter à la Section 00 01 50 - Liste des Dessins pour les dessins qui font partie de ce contrat.

3. ACHÈVEMENT DES TRAVAUX

- .1 Tous les travaux de génie civil tel que la chaussée, terrassements, travaux souterrains sanitaires, aqueduc, etc., doivent être achevés avant le 15 Novembre, 2016.
- .2 Installation complète et le démarrage de l'unité de traitement des eaux usées avant le 31 Décembre, 2016.

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, Résidus de cokéfaction, Oxyde d'éthylène, Isocyanates, 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 En plus de celles énumérées par la province, il peut également s'y trouver les matières désignées suivantes : mercure
 - .3 L'entrepreneur général est de prendre les précautions appropriées lorsqu'ils traitent avec les substances ci-dessus.

9. VENTILATION DES COÛTS

- .1 Soumettre pour l'approbation du représentant ministériel une ventilation des coûts dans les 72 heures qui suivent l'acceptation de la soumission.
- .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 (2) 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 Cinq (5) 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 bihebdomadaire 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 des copies électronique 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 et assurer leur déneigement pendant les travaux.
- .6 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 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.
- .12 Tous les travaux doivent être effectués en conformité avec le Règlement sur le bruit Règlement N° 253 – 2004 de la ville d'Ottawa.

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 10oC (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 calfeutrante 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 "Exigences Générales de Sécurité".

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 trois (3) exemplaires bilingues des manuels d'entretien ou deux (2) exemplaires de chacune des versions anglaises et françaises.
- .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:
 1. Norme 301 'Norme Travaux de construction', juin 1982;
 2. 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

333

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 à 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. 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 232oC (450oF).
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 à 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 (1) heure après la fin d'une journée de travail à chaud.
2. Chauffage provisoire : voir la Section 00 10 00, 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 détritits 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 détritits 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 naphtha, 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 38oC (100oF, tels que le naphtha 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.

13. Questions et/ou demandes d'explications

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

FIN DE SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Ontario Provincial Standard Specifications (OPSS).
- .2 Ontario Provincial Standard Drawings (OPSD).

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises of the rehabilitation of the watermains, the parking lot and service roads, the storm sewers and the exterior lighting for National Research Council of Canada (NRC) campus located at 100 Sussex Drive at the intersection with King Edward Avenue in Ottawa, Ontario. The site is located on the north side of the Sussex Drive, bound by the Rideau River to the east, the Ottawa River to the north and the British High Commissioner property to the west. Work includes the following:
 - .1 Asphalt Removal.
 - .2 Storm Sewers.
 - .3 Maintenance Holes and Catch Basins.
 - .4 Pre-manufacturer FRP Pump Station.
 - .5 Sewage Treatment Plant.
 - .6 Electrical Conduit.
 - .7 Excavation, Grading and Paving.
 - .8 Concrete Curbs and Sidewalks.
 - .9 Site Lighting.
 - .10 Landscaping.
 - .11 Other Related Work.

1.3 CONTRACT METHOD

- .1 Construct Work under lump sum price contract.
- .2 Relations and responsibilities between Contractor and Subcontractors assigned by Owner are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:
 - .1 Furnish to Contractor, bonds covering faithful performance of subcontracted work and payment of obligations thereunder when Contractor is required to furnish such bonds to Departmental Representative.
 - .2 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which Contractor is required to provide to Departmental Representative.

1.4 WORK BY OTHERS

- .1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.

- .2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

1.5 WORK SEQUENCE

- .1 Construct Work in stages to accommodate Owner's use of premises during construction.
 - .1 The Contractor will be required to submit a construction staging plan for approval to the Departmental Representative prior to the commencement of work for approval.
 - .2 Staging plan to accommodate and include the following provisions:
 - .1 Day time access to loading docks must remain active.
 - .2 Maintain Fire route access through site.
 - .3 Maintain a minimum of 230 parking spots during all phases of construction during regular business hours.
 - .4 Contractor to provide all necessary signage and barricades to identify closures and detours.
- .2 Co-ordinate Progress Schedule and co-ordinate with Owner Occupancy during construction.
- .3 Construct Work in stages to provide for continuous public usage. Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.
- .4 Task such as milling entire parking lot, grading, installation of underground services may be completed by closing off site after business hours and on weekends with approval of the Departmental Representative.
- .5 Maintain O.C. Transpo access (Route 9) along Sussex Drive and pedestrian access to all bus stops within the construction limits at all times. Provide O.C. Transpo at least three (3) working days' notice to coordinate any adjustments required to their facilities as a result of construction.

1.6 CONTRACTOR USE OF PREMISES

- .1 Limit use of premises for Work, storage, and for access to allow:
 - .1 Owner occupancy.
 - .2 Work by other contractors.
- .2 Co-ordinate use of premises under direction of Departmental Representative.
- .3 Contractor and his sub-contractors are limited to a total 6 parking spaces on site for the duration of the construction.
- .4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

- .5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.
- .6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.
- .7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.
- .8 Contractor will be responsible for snow removal of the entire construction area for the duration of the construction period.

1.7 OWNER OCCUPANCY

- .1 Owner will occupy premises during entire construction period for execution of normal operations.
- .2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.8 EXISTING SERVICES

- .1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hour notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic and tenant operations.
- .3 Provide alternative routes for personnel and vehicular traffic.
- .4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.
- .5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.
- .6 Provide temporary services when directed by Departmental Representative to maintain critical building and tenant systems.
- .7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.
- .8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

- .9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.
- .10 Record locations of maintained, re-routed and abandoned service lines.

1.9 DOCUMENTS REQUIRED

- .1 Maintain at job site, one (1) copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Change Orders.
 - .7 Other Modifications to Contract.
 - .8 Field Test Reports.
 - .9 Copy of Approved Work Schedule.
 - .10 Health and Safety Plan and Other Safety Related Documents.
 - .11 Geotechnical Report by Houle Chevrier Engineering Ltd. dated November 2013, Ref. No. 13-337.
 - .12 Other documents as specified.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General**1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE**

- .1 No measurement for payment will be made under this section. Include costs in items where required.

1.2 APPOINTMENT AND PAYMENT

- .1 Departmental Representative will appoint and pay for services of testing laboratory except follows:
 - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
 - .2 Inspection and testing performed exclusively for Contractor's convenience.
 - .3 Testing, adjustment and balancing of conveying systems, mechanical and electrical equipment and systems.
 - .4 Mill tests and certificates of compliance.
 - .5 Tests specified to be carried out by Contractor under the supervision of Departmental Representative.
 - .6 Additional tests specified as follows:
 - .1 Granular Gradation.
 - .2 Granular Compaction – Road Base and Sub-Base.
 - .3 Granular Compaction – Utility Trench.
 - .4 Asphalt Compaction, Voids, Gradation and AC Content.
 - .5 Concrete Strength.
 - .6 Concrete Air and Slump.
 - .7 Topsoil.
- .2 Where tests or inspections by designated testing laboratory reveal Work not in accordance with contract requirements, pay costs for additional tests or inspections as required by Departmental Representative to verify acceptability of corrected work.

1.3 CONTRACTOR'S RESPONSIBILITIES

- .1 Provide labour, equipment and facilities to:
 - .1 Provide access to Work for inspection and testing.
 - .2 Facilitate inspections and tests.
 - .3 Make good Work disturbed by inspection and test.
 - .4 Provide storage on site for laboratory's exclusive use to store equipment and cure test samples.
- .2 Notify Departmental Representative 48 hours (minimum) in advance of operations to allow for assignment of laboratory personnel and scheduling of test.

- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good Work that is covered before required inspection or testing is completed and approved by Departmental Representative.

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 ADMINISTRATIVE

- .1 Schedule and administer project meetings throughout the progress of the work at the call of the Departmental Representative.
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting four (4) days in advance of meeting date to Departmental Representative.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within five (5) days after meetings and transmit to meeting participants, affected parties not in attendance and Departmental Representative.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.2 PRECONSTRUCTION MEETING

- .1 Within 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Owner, Departmental Representative, Contractor, Major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
- .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
- .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work.
 - .3 Schedule of submission of shop drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00 - Construction Facilities.

- .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
- .6 Owner provided products.
- .7 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .8 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .9 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .10 Monthly progress claims, administrative procedures, photographs, hold backs.
- .11 Appointment of inspection and testing agencies or firms.
- .12 Insurances, transcript of policies.

1.3 PROGRESS MEETINGS

- .1 During course of Work and one (1) week prior to project completion, schedule progress meetings once a week, unless otherwise agreed upon with the Departmental Representative, Owner and Contractor.
- .2 Contractor, major Subcontractors involved in Work, Departmental Representative and Owner are to be in attendance.
- .3 Notify parties minimum five (5) days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within five (5) days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for effect on construction schedule and on completion date.
 - .12 Other business.

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 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
- .10 Keep one (1) reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which

adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

- .4 Allow five (5) days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
- .8 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
- .9 After Departmental Representative's review, distribute copies.

- .10 Submit three (3) prints of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit three (3) copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit three (3) copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within three (3) years of date of contract award for project.
- .13 Submit three (3) copies of certificates for requirements requested in specification sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit three (3) copies of manufacturer's instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit three (3) copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .16 Submit three (3) copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .17 Delete information not applicable to project.
- .18 Supplement standard information to provide details applicable to project.
- .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

- .20 Notwithstanding the above, digital versions of all required submissions (i.e. .pdf format) shall be acceptable and is the preferred method of submittals for this project. Digital versions shall contain all the same information as the hard copies described above.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

1.4 PHOTOGRAPHIC DOCUMENTATION

- .1 Submit electronic (.jpg format) and two (2) hard copies of color digital photographs in standard resolution of the pre-existing site conditions to the Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.

1.5 CERTIFICATES AND TRANSCRIPTS

- .1 Immediately after award of Contract, submit Workers' Compensation Board status.
- .2 Submit transcription of insurance immediately after award of Contract.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 – Submittal Procedures.

1.2 REFERENCES

- .1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 Province of Ontario
 - .1 Occupational Health and Safety Act, R.S.O. 1990.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative and authority having jurisdiction.
- .4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .5 Submit copies of incident and accident reports.
- .6 Submit WHMIS MSDS - Material Safety Data Sheets.
- .7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 10 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.
- .8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of

Work, and submit additional certifications for any new site personnel to Departmental Representative.

- .10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.4 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

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

1.7 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.8 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.9 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Health and Safety Act, R.S.O.
- .2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.10 UNFORSEEN HAZARDS

- .1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction and advise Departmental Representative verbally and in writing.

1.11 HEALTH AND SAFETY CO-ORDINATOR

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
 - .1 Have working knowledge of occupational safety and health regulations.
 - .2 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
 - .3 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
 - .4 Be on site during execution of Work and report directly to and be under direction of site supervisor.

1.12 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction, and in consultation with Departmental Representative.

1.13 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.14 BLASTING

- .1 Blasting or other use of explosives is not permitted without prior receipt of written instruction by Departmental Representative.
- .2 Do blasting operations in accordance with Section 31 23 16.26 - Rock Removal.

1.15 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

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 DEFINITIONS**

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.2 FIRES

- .1 Fires and burning of rubbish on site not permitted.

1.3 DRAINAGE

- .1 Provide Erosion and Sediment Control Plan identifying type and location of erosion and sediment controls provided. Ensure plan includes monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.
- .2 Storm Water Pollution Prevention Plan (SWPPP) to be substituted for erosion and sedimentations control plan.
- .3 Provide temporary drainage and pumping required to keep excavations and site free from water.
- .4 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of 2 m.
- .3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

- .4 Minimize stripping of topsoil and vegetation.
- .5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.5 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities' emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads and temporary granular parking lots.

1.6 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection plan.
- .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
- .2 Waste Management: separate waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .3 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.

END OF SECTION

Part 1 General

1.1 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, Contractor is to correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents there will be no compensation to the Contractor.

1.2 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work. Cost of such services will be borne by the Contractor.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative or Owner. Pay costs for retesting and re-inspection.

1.3 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.4 PROCEDURES

- .1 Notify appropriate agency Departmental Representative 48 hours in advance of requirement for tests, in order that attendance arrangements can be made.

- .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.5 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.6 REPORTS

- .1 Submit three (3) copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to subcontractor of work being inspected or tested.

1.7 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as requested.
- .2 Cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work will be appraised by Departmental Representative and may be authorized as recoverable.

1.8 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical systems.

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 MEASUREMENT FOR PAYMENT

- .1 No measurement for payment will be made for this section.

1.2 INSTALLATION AND REMOVAL

- .1 Provide temporary utilities controls in order to execute work expeditiously.
- .2 Remove from site all such work after use.

1.3 DEWATERING

- .1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.4 TEMPORARY POWER AND LIGHT

- .1 Provide and pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 230 volts 30 amps.
- .2 Arrange for connection with appropriate utility company. Pay costs for installation, maintenance, and removal.

1.5 TEMPORARY COMMUNICATION FACILITIES

- .1 Provide and pay for temporary telephone, fax, data hook up, equipment necessary for own use and use of Departmental Representative.

1.6 FIRE PROTECTION

- .1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.
- .2 Burning rubbish and construction waste materials is not permitted on site.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 1.189-00, Exterior Alkyd Primer for Wood.
 - .2 CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA-0121-M1978 (R2003), Douglas Fir Plywood.
 - .3 CAN/CSA-S269.2-M1987 (R2003), Access Scaffolding for Construction Purposes.
 - .4 CAN/CSA-Z321-96 (R2001), Signs and Symbols for the Occupational Environment.

1.2 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.3 SITE STORAGE/LOADING

- .1 Confine work and operations of employees by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with weight or force that will endanger Work.

1.4 CONSTRUCTION PARKING

- .1 Parking will be permitted on site provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .3 Clean taxi areas where used by Contractor's equipment.

1.5 OFFICES

- .1 Provide office heated to 22 °C, lighted 750 lx and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors to provide their own offices as necessary. Direct location of these offices.
- .4 Provide private washroom facilities for Departmental Representative adjacent to office complete with flush or chemical type toilet, lavatory and mirror and maintain supply of paper towels and toilet tissue.
- .5 Maintain in clean condition.

1.6 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in manner to cause least interference with work activities.

1.7 SANITARY FACILITIES

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.8 CONSTRUCTION SIGNAGE

- .1 Provide and erect project sign, within three (3) weeks of signing Contract, in a location designated by Departmental Representative.
- .2 Construction sign of wood frame and plywood construction painted with exhibit lettering.
- .3 No other signs or advertisements, other than warning signs, are permitted on site.
- .4 Signs and notices for safety and instruction in both official languages Graphic symbols to CAN/CSA-Z321.
- .5 Maintain approved signs and notices in good condition for duration of project, and dispose of offsite on completion of project or earlier if directed by Departmental Representative.

1.9 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.

- .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
- .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.
- .4 Protect travelling public from damage to person and property.
- .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
- .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
- .7 Construct access and haul roads necessary at the approval of the Departmental Representative.
- .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
- .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
- .10 Provide dust control as required to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .12 Ensure full and clear visibility for full width of haul road and work areas during night work operations (if required).
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.10 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways on a regular basis as directed by the Departmental Representative.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material not in construction facilities.

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 Owner's identification of existing survey control points and property limits.

1.2 MEASUREMENT FOR PAYMENT

- .1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor (or approved equivalent), licensed to practice in Place of Work, acceptable to Departmental Representative.

1.4 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Departmental Representative.
- .4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.5 SURVEY REQUIREMENTS

- .1 Establish two (2) permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data, in Project Record Documents.
- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, fill and topsoil placement.
- .4 Stake slopes.
- .5 Establish pipe invert elevations.
- .6 Establish lines and levels for mechanical and electrical work.

1.6 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- .2 Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.7 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.8 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 Record locations of maintained, re-routed and abandoned service lines.

1.9 SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying those elevations and locations of completed Work that conform and do not conform to Contract Documents.

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 MEASUREMENT FOR PAYMENT

- .1 No measurement for payment will be made under this section. Include costs in items where required.

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Departmental Representative.
- .3 Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .4 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .5 Dispose of waste materials and debris off site.
- .6 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

1.3 FINAL CLEANING

- .1 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .2 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .3 Remove waste products and debris including that caused by Owner or other Contractors.
- .4 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative.
- .5 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures.
- .7 Clean lighting reflectors, lenses, and other lighting surfaces.
- .8 Sweep and wash clean paved areas.

- .9 Remove snow and ice from access to building.

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 MEASUREMENT FOR PAYMENT

- .1 No measurement for payment will be made under this section. Include costs in items where required.

1.2 WASTE MANAGEMENT GOALS

- .1 Accomplish maximum control of solid construction waste.
- .2 Preserve environment and prevent pollution and environment damage.

1.3 DEFINITIONS

- .1 Class III: non-hazardous waste - construction renovation and demolition waste.
- .2 Cost/Revenue Analysis Workplan (CRAW): based on information from WRW, and intended as financial tracking tool for determining economic status of waste management practices.
- .3 Demolition Waste Audit (DWA): relates to actual waste generated from project.
- .4 Inert Fill: inert waste - exclusively asphalt and concrete.
- .5 Materials Source Separation Program (MSSP): consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.
- .7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:
 - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
 - .2 Returning reusable items including pallets or unused products to vendors.
- .10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

- .11 Separate Condition: refers to waste sorted into individual types.
- .12 Source Separation: acts of keeping different types of waste materials separate beginning from first time they became waste.
- .13 Waste Audit (WA): detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction, or renovation project. Indicates quantities of reuse, recycling and landfill.
- .14 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .15 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials. Refer to Schedule B. WRW is based on information acquired from WA.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.
- .2 Unless specified otherwise, materials for removal do not become Contractor's property unless approved by the Departmental Representative.
- .3 Protect, stockpile and store salvaged items.
- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect surface drainage, mechanical and electrical from damage and blockage.
- .6 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.

1.5 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.
- .3 Remove materials from deconstruction as deconstruction/disassembly Work progresses.

- .4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.6 USE OF SITE AND FACILITIES

- .1 Execute work with least possible interference or disturbance to normal use of premises.

1.7 SCHEDULING

- .1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 APPLICATION

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Environmental Protection Act (CEPA):
 - .1 SOR/2008-197, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations.

1.2 MEASUREMENT FOR PAYMENT

- .1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 ACCEPTANCE OF WORK PROCEDURES

- .1 Contractor's Inspection: conduct inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
 - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and submit verification that corrections have been made.
 - .2 Request Departmental Representative's Inspection.
- .2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify defects and deficiencies. Contractor to correct Work as directed.
- .3 Completion Tasks: submit written certificates in English that tasks have been performed as follows:
 - .1 Work: completed and inspected for compliance with Contract Documents.
 - .2 Defects: corrected and deficiencies completed.
 - .3 Equipment and systems: tested and fully operational.
 - .4 Certificates required by Electrical Safety Authority: submitted.
- .4 Final Inspection: when Completion tasks are done, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request re-inspection.
- .5 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for certificate of Substantial Performance.
- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

- .7 Final Payment: when Departmental Representative considers final deficiencies and defects corrected and requirements of Contract met, make application for final payment.
- .8 Payment of Holdback: after issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

- .1 In accordance with Section 01 74 11 - Cleaning.
- .2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

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 MEASUREMENT FOR PAYMENT

- .1 No measurement for payment will be made under this section. Include costs in items where required.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Warranty Meeting:
 - .1 Convene meeting one (1) week prior to contract completion with contractor's representative and Departmental Representative, in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's installation instructions and warranty requirements.
 - .2 Departmental Representative to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty work action: provide name, telephone number and address of company authorized for construction warranty work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty work action.

1.3 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Two (2) weeks prior to Substantial Performance of the Work, submit to the Departmental Representative four (4) final copies of operating and maintenance manuals in English and French.
- .3 Provide spare parts, maintenance materials and special tools of same quality and manufacture as products provided in Work.
- .4 Provide evidence, if requested, for type, source and quality of products supplied.

1.4 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

- .3 When multiple binders are used correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide scaled CAD files in .dwg format on CD.

1.5 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties.
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.

1.6 AS-BUILTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions, at site for Owner one (1) record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.

- .4 Change Orders and other modifications to Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.

1.7 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of red lined drawings, provided by Departmental Representative.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.
 - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by change orders.
 - .6 Details not on original Contract Drawings.
 - .7 References to related shop drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and change orders.

- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.
- .7 Provide digital photographs, if requested, for site records.

1.8 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00 - Examination and Preparation, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

1.9 EQUIPMENT AND SYSTEMS

- .1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide Contractor's co-ordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

- .14 Include test and balancing reports.

1.10 MATERIALS AND FINISHES

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-Protection and Weather-Exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

1.11 MAINTENANCE MATERIALS

- .1 Spare Parts:
 - .1 Provide spare parts, in quantities specified in individual specification sections.
 - .2 Provide items of same manufacture and quality as items in Work.
 - .3 Deliver to location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .2 Extra Stock Materials:
 - .1 Provide maintenance and extra materials, in quantities specified in individual specifications sections.
 - .2 Provide items of same manufacturer and quality as items in Work.
 - .3 Deliver to location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative.
 - .2 Include approved listings in Maintenance Manual.
 - .5 Obtain receipt for delivered products and submit prior to final payment.
- .3 Special Tools:
 - .1 Provide special tools, in quantities specified in individual specification sections.
 - .2 Provide items with tags identifying their associated function and equipment.
 - .3 Deliver to location as directed; place and store.
 - .4 Receive and catalogue items.
 - .1 Submit inventory listing to Departmental Representative.

- .2 Include approved listings in Maintenance Manual.

1.12 DELIVERY, STORAGE AND HANDLING

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.

1.13 WARRANTIES AND BONDS

- .1 Develop warranty management plan to contain information relevant to Warranties.
- .2 Submit warranty management plan, 30 days before planned pre-warranty conference, to Departmental Representative approval.
- .3 Warranty management plan to include required actions and documents to assure that Departmental Representative receives warranties to which it is entitled.
- .4 Provide plan in narrative form and contain sufficient detail to make it suitable for use by future maintenance and repair personnel.
- .5 Submit, warranty information made available during construction phase, to Departmental Representative for approval prior to each monthly pay estimate.
- .6 Assemble approved information in binder and submit upon acceptance of work. Organize binder as follows:
- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- .4 Verify that documents are in proper form, contain full information, and are notarized.
- .5 Co-execute submittals when required.
- .6 Retain warranties and bonds until time specified for submittal.
- .7 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.

- .8 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Departmental Representative.
- .9 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include transformers and commissioned systems.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.
 - .4 Name and phone numbers of manufacturers or suppliers.
 - .5 Names, addresses and telephone numbers of sources of spare parts.
 - .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
 - .7 Cross-reference to warranty certificates as applicable.
 - .8 Starting point and duration of warranty period.
 - .9 Summary of maintenance procedures required to continue warranty in force.
 - .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
 - .11 Organization, names and phone numbers of persons to call for warranty service.
 - .12 Typical response time and repair time expected for various warranted equipment.
 - .4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
 - .5 Procedure and status of tagging of equipment covered by extended warranties.
 - .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .10 Respond in a timely manner to oral or written notification of required construction warranty repair work.
- .11 Written verification will follow oral instructions. Failure to respond will be cause for the Departmental Representative to proceed with action against Contractor.

1.14 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Departmental Representative.

- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Methods for removal of existing asphalt pavement.

1.2 RELATED SECTIONS

- .1 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

1.3 MEASUREMENT PROCEDURES

- .1 Included in Balance of Project.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Removed asphalt shall be taken to a recycling facility.

Part 2 Products

2.1 EQUIPMENT

- .1 Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

Part 3 Execution

3.1 PREPARATION

- .1 Prior to beginning removal operation, inspect and verify with Departmental Representative areas, depths and lines of asphalt pavement to be removed.
- .2 Sawcut extent of asphalt to be removed. Sawcut and prepare step connection where indicated and as per detail drawings.

3.2 PROTECTION

- .1 Protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Departmental Representative at no additional cost.

3.3 REMOVAL

- .1 Remove existing asphalt pavement to lines and grades as indicated.
- .2 Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .3 Provide for suppression of dust generated by removal process.

3.4 SWEEPING

- .1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooming as required.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 35 29.06 – Health and Safety Requirements.
- .2 Section 01 74 21 – Construction/Demolition Waste Management and Disposal.
- .3 Section 31 05 16 – Aggregate Materials.
- .4 Section 32 11 23 – Aggregate Base Courses.
- .5 Section 32 16 15 – Concrete Walks, Curbs and Gutters.

1.2 MEASUREMENT FOR PAYMENT

- .1 No measurement for payment will be made under this section. Include costs in items where required.

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C260-01, Standard Specification for Air-Entraining Admixtures for Concrete.
 - .2 ASTM C309-03, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 - .3 ASTM C494/C494M-05, Standard Specification for Chemical Admixtures for Concrete.
 - .4 ASTM C1017/C1017M-03, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
 - .5 ASTM D412-98a (2002) e1, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
 - .6 ASTM D624-00e1, Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.
 - .7 ASTM D1751-04, Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
 - .8 ASTM D1752-04a, Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.

- .2 CAN/CGSB-51.34-M86 (R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1/A23.2-2004, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
 - .2 CSA A283-00(R2003), Qualification Code for Concrete Testing Laboratories.
 - .3 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation meeting once week prior to beginning concrete work.
 - .1 Ensure key personnel, site supervisor, Departmental Representative, speciality contractor – finishing, forming attend.
 - .1 Verify project requirements.

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit testing results and reports for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.
- .3 Concrete pours: submit accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken.
- .4 Concrete hauling time: submit for review by Departmental Representative deviations exceeding maximum allowable time of 120 minutes for concrete to be delivered to site of Work and discharged after batching.
- .5 Provide two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 – Health and Safety Requirements and Section 01 35 43 – Environmental Procedures.

1.6 QUALITY ASSURANCE

- .1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
- .2 Submit to Departmental Representative, minimum 4 weeks prior to starting concrete work, valid and recognized certificate from plant delivering concrete.
 - .1 Provide test data and certification by qualified independent inspection and testing laboratory that materials used in concrete mixture will meet specified requirements.
- .3 Minimum 4 weeks prior to starting concrete work, submit proposed quality control procedures for review by Departmental Representative on following items:

- .1 Curing.
- .2 Finishes.
- .3 Joints.
- .4 Quality Control Plan: submit written report to Departmental Representative verifying compliance that concrete in place meets performance requirements of concrete.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements:
 - .1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.
 - .1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.
 - .2 Deviations to be submitted for review by Departmental Representative.
 - .2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Performance: to CSA A23.1/A23.2.

2.2 PERFORMANCE CRITERIA

- .1 Quality Control Plan: Ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance.

2.3 MATERIALS

- .1 Cement: to CAN/CSA-A3001, Type GU.
- .2 Water: to CSA-A23.1.
- .3 Aggregates: to CAN/CSA-A23.1/A23.2.
- .4 Admixtures:
 - .1 Air entraining admixture: to ASTM C260.
 - .2 Chemical admixture: to ASTM C494 ASTM C1017. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .5 Curing compound: to CSA-A23.1/A23.2 white.

2.4 MIXES

- .1 Performance Method for specifying concrete: to meet Departmental Representative performance criteria in accordance with CAN/CSA-A23.1/A23.2.
 - .1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as in Quality Control Plan.
 - .1 Compressive strength at 28 days: 32 MPa minimum.
 - .2 Provide quality management plan to ensure verification of concrete quality to specified performance.
 - .3 Concrete supplier's certification: both batch plant and materials meet CSA A23.1 requirements.

Part 3 Execution

3.1 PREPARATION

- .1 Obtain Departmental Representative's written approval before placing concrete.
 - .1 Provide 24 hours minimum notice prior to placing of concrete.
- .2 During concreting operations:
 - .1 Development of cold joints not allowed.
 - .2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.
- .3 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .4 Protect previous Work from staining.
- .5 Clean and remove stains prior to application for concrete finishes.
- .6 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, and air temperature and test samples taken.
- .7 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1/A23.2.
- .2 Finishing and curing:
 - .1 Finish concrete in accordance with CSA-A23.1/A23.2.
 - .2 Use procedures as reviewed by Departmental Representative or those noted in CSA-A23.1/A23.2 to remove excess bleed water. Ensure surface is not damaged.
 - .3 Use curing compounds compatible with applied finish on concrete surfaces. Provide written declaration that compounds used are compatible.

- .3 Joint fillers:
 - .1 Furnish filler for each joint in single piece for depth and width required for joint, unless otherwise authorized by Departmental Representative.
 - .2 When more than one piece is required for joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
 - .3 Locate and form expansion joints per OPSD Standards.
 - .4 Install joint filler.
 - .5 Use 12 mm thick joint filler to separate slabs-on-grade from vertical surfaces and extend joint filler from bottom of slab to within 12 mm of finished slab surface unless indicated otherwise.

3.3 SURFACE TOLERANCE

- .1 Concrete tolerance in accordance with CSA-A23.1/A23.2.

3.4 FIELD QUALITY CONTROL

- .1 Site tests: conduct following test as follows in accordance with Section 01 45 00 - Quality Control and submit report for the following:
 - .1 Concrete pours.
 - .2 Slump tests.
 - .3 Air Content.
 - .4 Compressive Strength at 7 and 28 days.
 - .5 Air and concrete temperature.
- .2 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review in accordance with CSA-A23.1/A23.2.
 - .1 Ensure testing laboratory is certified in accordance with CSA A283.
- .3 Ensure test results are distributed for discussion at pre-pouring concrete meeting between testing laboratory and Departmental Representative.
- .4 Contractor will pay for costs of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.
- .5 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .6 Non-Destructive Methods for Testing Concrete: in accordance with CSA-A23.1/A23.2.
- .7 Inspection or testing by Departmental Representative will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.5 CLEANING

- .1 Clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Divert unused concrete materials to local quarry.
 - .2 Provide appropriate area on job site where concrete trucks can be safely washed.
 - .3 Divert unused admixtures and additive materials (pigments, fibres) from landfill to official hazardous material collections site as approved by Departmental Representative.
 - .4 Do not dispose of unused admixtures and additive materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.
 - .5 Prevent admixtures and additive materials from entering drinking water supplies or streams.
 - .6 Using appropriate safety precautions, collect liquid or solidify liquid with inert, non-combustible material and remove for disposal.
 - .7 Dispose of waste in accordance with applicable local, Provincial/Territorial and National regulations.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This section covers items common to Sections of Division 26. This section supplements requirements of Division 1.

1.2 REFERENCES

- .1 Perform all work to meet or exceed the requirements of the Canadian Electrical Code, CSA Standard C22.1 - (latest edition).
- .2 Consider CSA Electrical Bulletins in force at time of tender submission, while not identified and specified by number in this Division, to be forming part of related CSA Part II standard.
- .3 Do overhead and underground systems in accordance with CSA C22.3 except where specified otherwise.
- .4 Where requirements of this specification exceed those of above mentioned standards, this specification shall govern.
- .5 Notify the NRC Departmental Representative as soon as possible when requested to connect equipment supplied by NRC which is not CSA approved.
- .6 Refer to Sections 00 10 00 & 0015 45.

1.3 DEFINITIONS

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.4 DESIGN REQUIREMENTS

- .1 “Inspection Authority” means Electrical Safety Authority.
- .2 “Supply Authority” means Hydro Ottawa.
- .3 “Provide” means supply and install.
- .4 Operating voltages: to CAN3-C235.
- .5 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

- .6 Language operating requirements: provide identification nameplates for control items in English and French.
- .7 Use one nameplate for both languages.

1.5 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop drawings:
 - .1 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, and other items that must be shown to ensure co-ordinated installation.
 - .2 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .3 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .4 Submit 6 copies of 600 x 600 mm minimum size drawings and product data.
 - .5 If changes are required, notify Engineer of these changes before they are made.
- .3 Submit to Inspection Authority and Supply Authority necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .4 Pay associated fees and obtain all permits required for the performance of the work.
- .5 Quality Control:
 - .1 Provide CSA certified equipment and material.
 - .2 Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for special approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions of contract.
 - .5 Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
 - .6 Submit certificate of acceptance from inspection authority upon completion of Work to Engineer.
- .6 Manufacturer's Field Reports: submit to Engineer manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.

1.6 QUALITY ASSURANCE

- .1 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction as per the conditions of Provincial Act respecting manpower vocational training and qualification.
 - .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
 - .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .2 Site Meetings:
 - .1 Site Meetings: as part of Manufacturer's Field Services described in Part 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
 - .1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.
- .3 The project manager and site foreman assigned to this project shall be consistent from project start to project completion. No substitutions shall be permitted without written approval/acceptance from the Engineer and Owner.

1.7 STARTUP

- .1 Instruct the NRC Departmental Representative and operating personnel in the operation, care and maintenance of equipment supplied under this contract.

1.8 OPERATING INSTRUCTIONS

- .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
- .4 Post instructions where directed.

- .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.9 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment and fixtures indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Engineer of impending installation and obtain his approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.10 EXISTING SERVICES

- .1 Where work involves breaking into or connecting to existing services, carry out work at times directed by governing authorities, with minimum of disturbance to pedestrian and vehicular traffic.
- .2 Before commencing work, establish location and extent of service lines in area of work and notify Departmental Representative of findings.
- .3 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .4 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.
- .5 Record locations of maintained, re-routed and abandoned service lines.

1.11 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

- .1 Execute work with least possible interference or disturbance to occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

- .2 Where security has been reduced by work of Contract, provide temporary means to maintain security.
- .3 Where elevators, dumbwaiters, conveyors or escalators exist in building, only those assigned for Contractor's use may be used for moving men and materials within building. Protect walls of passenger elevators, to approval of Departmental Representative before use. Accept liability for damage, safety of equipment and overloading of existing equipment.
- .4 Provide temporary dust screens, barriers, warning signs in locations where renovation and alteration work is adjacent to areas used by public or government staff.

1.12 ADDITIONAL DRAWINGS

- .1 Engineer may furnish additional drawings to assist proper execution of work. These drawings will be issued for clarification only. Such drawings shall have same meaning and intent as if they were included with plans referred to in contract documents.

1.13 GUARANTEES

- .1 Before completion of work collect all agreements, guarantees and warranties and deposit with Departmental Representative.
- .2 Work to be guaranteed for a period of one full year from the date of practical completion, unless specified otherwise.
- .3 Final payment will not be released prior to receipt in writing of all guarantees.

1.14 CONTRACT

- .1 Project drawings and specifications are complimentary to this General Specification. In cases of conflict, ambiguity or doubt, apply to the Departmental Representative for a ruling in writing.
- .2 All jobs must be complete, performed and finished in a workmanlike manner. Work and materials of an incidental nature, necessary by implication to produce the finished job as specified, shall be supplied, even when not listed or described in detail.
- .3 No deviations from the specifications or drawings will be allowed without written permission of the Departmental Representative.

1.15 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for 90 degree C rated conductors, either copper or aluminum. Where existing equipment is rated for less than 90 degree C, transition to lower temperature rating 1.5 meters from termination point using larger sized wire and conduit to suit.

1.16 COST BREAKDOWN

- .1 Submit an itemized breakdown of the contract price before submitting the first application for payment.
- .2 In this breakdown, present separate prices for the distribution equipment, fixtures, branch wiring, special equipment and other items as required by the Engineer. Indicate labour/material breakdown separately. No progress payment will be approved until this breakdown has been presented in an approved form.

1.17 AS-BUILT DRAWINGS BY CONTRACTOR

- .1 The successful contractor shall be responsible for a complete set of as-built drawings.
- .2 A set of prints shall be kept up-to-date as the work progresses. Show all changes and deviations from the original tender documents whether they be issued change orders, site instructions or contractor's changes.
- .3 Record exactly the location of services where concealed or buried or where capped or plugged for future use. As-built drawings shall show conduit sizes and runs, junction boxes, pull boxes, wiring with circuit numbers.
- .4 The Engineer shall make available the Tender Issue of the drawings. This contractor shall update these with all Change Orders, Site Instructions, and to reflect site conditions.
- .5 The Engineer reserves the right to request a number of verifications necessary to prove the exactness of the as-built drawings.
- .6 Upon completion of the Project, the contractor shall turn over a complete set of as-built drawings (marked up white prints in red ink) to the Engineer. The Engineer shall incorporate information received via the as-built drawings onto a set of Record Drawings for the Client.

1.18 CONSTRUCTION DRAWINGS AND SPECIFICATIONS

- .1 Following execution of the contract, an "Issued for Construction" revision of the drawings and specifications, which incorporates all addenda issued during the tender period, will be prepared by the Engineer and provided to the contractor for their review. The contractor shall review the "Issued for Construction" drawings and specifications to confirm that all addenda are included and confirm the contractor's acceptance in writing back to the Engineer.
- .2 The "Issued for Construction" drawings and specifications will be provided to the contractor for his initial review no later than 3 weeks following execution of the contract. No claims for delays by the contractor will be considered relating to this schedule.

- .3 Following acceptance of the “Issued for Construction” drawings and specifications by the contractor, the Engineer will supply the following items to the Prime Consultant for distribution to the contractor:
 - .1 Email electronic (pdf) files of the entire set of “Issued for Construction” drawings and specifications.
 - .2 One (1) CD containing the entire set of “Issued for Construction” drawings and specifications in electronic (pdf) files.
- .4 Electronic drawings in Autocad (ACAD) 2008 format may be available to the contractor at the Engineer’s discretion. The contractor will be responsible to sign a release form provided by the Engineer prior to receiving ACAD drawings. ACAD drawings will only be provided on a case by case basis at the Engineer’s discretion and the contractor will be expected to justify the need for the ACAD drawings. Note that some ACAD drawings may require additional Autodesk software to be fully compatible (ie. Autocad MEP, etc.).

1.19 DEMOLITION

- .1 Full extent of demolition is not illustrated on drawings. All services under equipment which have become redundant under the contract shall be removed. All items removed during demolition and which are not to be re-used shall be removed from site.
- .2 Contractor to relocate any electrical items which interfere with the new construction and may not appear on drawings.
- .3 Contractor is responsible for the reconnection of any services which are to remain and which have been disconnected during the course of demolition or construction.
- .4 All equipment to be re-used is to be cleaned of paint, plastic, etc. to the satisfaction of the Engineer.
- .5 Where indicated, existing site lighting fixtures, poles and bases are to be removed. Existing redundant underground ducts shall be abandoned.
- .6 Contractor is responsible for reconnecting any existing loads which do not appear on panel details and which are to be re-used.
- .7 Where existing materials are to be re-used, the contractor for this Division is responsible for their removal, storage, cleaning and reinstallation.
- .8 Turn over to the Owner any redundant existing material or equipment designated by the Owner or specified on drawings.
- .9 Where some existing materials or equipment are to be retained in place or reconnected, it is the responsibility of the contractor of this Division to identify and protect the materials or equipment prior to the commencement of demolition.

- .10 Maintain adequate structural support for equipment and material during demolition process.
- .11 It is the responsibility of this Contractor to maintain electrical services and systems at all times to areas beyond the construction area.
- .12 Reinstate immediately any existing services disrupted during demolition not intended to be removed as part of this contract.

1.20 SITE VISIT

- .1 Acquire a full working knowledge of the building site and any existing conditions thereon which might affect any aspect of the job. Inspect the contract drawings for all trades since no extras will be entertained for work which could otherwise have been foreseen by prior inspection of the site and/or the contract drawings.

1.21 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.

1.22 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.

1.23 COOPERATION

- .1 Before commencing work, examine the contract drawings and schedules of all other trades. Report at once to the Engineer any interference which might affect the scheduling of, or performance of, work under this Division.
- .2 During construction, ensure that interference with the work of other trades is kept to a minimum and that the finished work of other trades is protected against damage from the electrical work.

- .3 Coordinate any opening or sleeves required for the installation of circuits or equipment so as not to interrupt the progress of masonry and concrete work.
- .4 Obtain approval from the Engineer, or from the Contractor responsible for structural members, before any openings are cut in structural supports, either concrete or steel.

1.24 CUTTING, FITTING AND PATCHING

- .1 Execute cutting (including excavation), fitting and patching required to make work fit properly.
- .2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.
- .3 Obtain Engineer's approval before cutting, boring or sleeving load-bearing members.
- .4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .5 Fit work airtight to sleeves, ducts and conduits.
- .6 Scanning of concrete floor slab is required before cutting to locate existing rebars and conduits and to obtain Owner's approval for proposed cutting or core drilling. Repair all existing work damaged by cutting or core drilling at no extra cost to the contract.

1.25 SHUTDOWN OF SERVICES AND SYSTEMS

- .1 All shut-down to be in accordance with Division 1.
- .2 Contractors are to verify with Owner before making any connection to any existing systems. This will ensure that (1) the Owner is aware that work will be done on a system and (2) that the contractor is working on a system that is working when he starts his work.

1.26 CHANGES IN THE WORK

- .1 Changes in the work may be requested from time to time by the issuance of a Contemplated Change Notice (CCN) and/or Proposed Change (PC). In addition to the net cost of the change, the Contractor shall be entitled to a 15% fee to cover overheads & profit on his work and a 10% fee to cover overheads and profit on sub-trades.
- .2 Provide detailed breakdowns of material and labour with unit prices and extensions required for review of Contemplated Change Notices (CCN's) or Proposed Changes (PC's).

- .3 Cost quotations shall be based on industry accepted costing methods. Wiring, conduit and similar commodity-type materials shall be based on current Trade Service Canadian Monitor Plus net pricing with a 30% discount applied. Submit supplier invoices for other types of material such as power distribution equipment, light fixtures, heating products, fire alarm components, etc.
- .4 Blended labour rates for all personnel for the duration of the project shall not exceed the following:
 - .1 Normal working hours: \$83.00 / hour
 - .2 Premium night shift (minimum three consecutive night shifts): \$110.00 / hour
 - .3 Overtime: \$137.00 / hour
- .5 Required labour shall be evaluated based on published NECA Manual of Labour Units, current at time of tender closing, using the “normal” column for unoccupied areas and the “difficult” column in occupied areas or areas of excessively high ceilings, subject to Engineer’s review. No other Job Factors shall be considered applicable.
- .6 The following job expenses shall be considered to be acceptable in certain pricing exercises:
 - .1 Bonding costs.
 - .2 Warranty costs where considered acceptable shall be based on 2% of the material & labour cost for the change.
 - .3 Drafting costs (where interference /coordination drawings have been requested as part of the contract) shall be considered based on 2% of the labour cost for the change. Equipment costs will not be considered in the formula.
 - .4 Hoisting where considered acceptable (ie. Crane is off site) shall be charged based on current craning costs.
 - .5 Equipment rentals for large equipment (ie. Not small tools covered in the labour units) shall be charged based on current rental rates.
 - .6 Core drilling where considered acceptable shall be charged as a job expense.
 - .7 Travel in accordance with the applicable union agreement shall be considered to be acceptable as a job expense.
- .7 The following job expenses shall NOT be considered acceptable under any circumstances:
 - .1 Supervision (foreman, site superintendent, etc – covered in blended rate above).
 - .2 Garbage Bins/Clean-up.
 - .3 Shipping and deliveries.
 - .4 Project Management.
 - .5 Estimating.
 - .6 Special Cleaning.
 - .7 Special Handling / Storage.
 - .8 Equipment rentals for small tools.
 - .9 Equipment Start-up.
 - .10 Any other Non Productive Time items

- .8 The Electrical Contractor shall submit a template proposed to be used for any CCN's/PC's as a formal shop drawing submission for review and recommended acceptance prior to any CCN's/PC's being issued.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 Provide material and equipment in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.
- .3 Factory assemble control panels and component assemblies.

2.2 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.

2.3 WIRING TERMINATIONS

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

2.4 EQUIPMENT IDENTIFICATION

- .1 Identify 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 Lamicoïd nameplates shall be rigid lamicoïd, 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 lamicoïd nameplates, mount nameplates using two-sided tape.
- .11 For all exterior lamicoïd 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 lamicoïd nameplates to be 3.7 mm (3/16") diameter to allow for expansion of lamicoïd 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 lamicoïd 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.

2.5 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.

2.6 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.

2.7 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.

2.8 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.

Part 3 Execution

3.1 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2 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.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete.
 - .1 Sleeves through concrete: sized for free passage of conduit, and protruding 50 mm.

3.4 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, fuses, are installed to values and settings as indicated on the Drawings.

3.5 FIELD QUALITY CONTROL

- .1 Furnish a Certificate of Acceptance from Inspection Authority on completion of work
- .2 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.
- .3 Conduct following 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.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .5 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.

3.6 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.

3.7 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.

3.8 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.

3.9 CLEANING

- .1 Provide cleaning in accordance with Section 01 74 11 – Cleaning.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

3.10 CLOSEOUT SUBMITTALS

- .1 Provide closeout documentation in accordance with Section 01 78 00 – Closeout Submittals.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for wire and box connectors.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-C22.2 No.18-98, Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
 - .2 CSA C22.2 No.65-93(R1999), Wire Connectors.
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
 - .1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
- .3 National Electrical Manufacturers Association (NEMA)

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, metal, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Construction Manager's Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Engineer.

Part 2 Products

2.1 MATERIALS

- .1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.

Part 3 Execution

3.1 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
 - .2 Install fixture type connectors and tighten. Replace insulating cap.
 - .3 Install bushing stud connectors in accordance with NEMA.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS -

- .1 Section 26 05 20 - Wire and Box Connectors - 0 - 1000 V.

1.2 REFERENCES

- .1 CSA C22.2 No .0.3-96, Test Methods for Electrical Wires and Cables.

1.3 PRODUCT DATA

- .1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, metal, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Construction Manager's Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Engineer.

Part 2 Products

2.1 WIRES

- .1 Conductors shall be copper, stranded for 10 AWG and larger. Minimum size: 12 AWG.
- .2 Size as indicated, with 600 V insulation of cross-linked thermosetting polyethylene material rated RW90 XLPE or RWU90 XLPE, Non Jacketted. Use RWU90 for underground and outdoor circuits and feeders.

2.2 ARMOURED CABLES

- .1 Conductors: insulated, copper, size as indicated.
- .2 Type: AC90.
- .3 Armour: interlocking type fabricated from aluminum strip.

- .4 Connectors: anti short connectors.

2.3 CONTROL CABLES

- .1 Type: LVT: 2 soft annealed copper conductors, sized as indicated:
 - .1 Insulation: thermoplastic.
 - .2 Sheath : thermoplastic jacket, FT-6 rated.
- .2 Type: 600 V stranded copper conductors, minimum size 16AWG.
 - .1 Insulation: RW90 (x-link).

Part 3 Execution

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Perform tests using method appropriate to site conditions and to approval of local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.

3.2 GENERAL CABLE INSTALLATION

- .1 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - (0-1000 V).
- .2 Cable Colour Coding: to Section 26 05 00 - Common Work Results for Electrical.
- .3 Conductor length for parallel feeders to be identical.
- .4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- .5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
- .6 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.

3.3 INSTALLATION OF BUILDING WIRES

- .1 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

3.4 INSTALLATION OF ARMOURED CABLES

- .1 Group cables wherever possible on channels.
- .2 Use only above ceiling or in partitions, 3 meter maximum length.

3.5 INSTALLATION OF CONTROL CABLES

- .1 Install control cables in conduit.
- .2 Ground control cable shield.

3.6 INSTALLATION OF UNDERGROUND WIRES

- .1 Install wiring as follows:
 - .1 In underground conduit systems in accordance with Sections 26 05 34, 26 05 43.01, 33 65 76 and 33 71 73.02.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 - Common Work Results - Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association, (CSA International)

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, metal, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Construction Manager's Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Engineer.

Part 2 Products

2.1 EQUIPMENT

- .1 Copper conductor: minimum 6m long for each concrete encased electrode, bare, stranded, tinned, soft annealed, size as indicated.
- .2 Rod electrodes: copper clad steel 19mm by 3m long.
- .3 Grounding conductors: bare stranded copper, soft annealed, size as indicated.
- .4 Insulated grounding conductors: green, type to Section 26 05 21.
- .5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermit welded type conductor connectors.
 - .5 Bonding jumpers, straps.
 - .6 Pressure wire connectors.

Part 3 Execution

3.1 INSTALLATION GENERAL

- .1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Provide separate insulated ground wire in all conduits.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to electrodes, using copper welding by thermit process.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Soldered joints not permitted.
- .7 Install separate ground conductor to outdoor lighting standards.
- .8 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

3.2 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list. Distribution panels, outdoor lighting.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Engineer and local authority having jurisdiction over installation.
- .3 Perform tests before energizing electrical system.
- .4 Disconnect ground fault indicator during tests.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 SUPPORT CHANNELS

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

Part 3 Execution

3.1 INSTALLATION

- .1 Secure equipment to masonry, tile and plaster surfaces with nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
- .6 Fasten exposed conduit or cables to building construction or support system using straps.
 - .1 One-hole steel straps to secure surface conduits and cables 50 mm and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
 - .3 Beam clamps to secure conduit to exposed steel work.
- .7 Suspended support systems.
 - .1 Support individual cable or conduit runs with 6 mm dia threaded rods and spring clips.
 - .2 Support 2 or more cables or conduits on channels supported by 6 mm dia threaded rod hangers where direct fastening to building construction is impractical.
- .8 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .9 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.

- .10 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .11 Do not use supports or equipment installed for other trades for conduit or cable support.
- .12 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

Part 2 Products

2.1 SPLITTERS

- .1 Construction: sheet metal enclosure, welded corners and formed hinged cover suitable for locking in closed position.
- .2 Terminations: main and branch lugs to match required size and number of incoming and outgoing conductors as indicated.
- .3 Spare Terminals: minimum three spare terminals or lugs on each connection or lug block sized less than 400 A.

2.2 JUNCTION AND PULL BOXES

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

2.3 CABINETS

- .1 Construction: welded sheet steel hinged door, latch lock 2 keys and catch
- .2 Type E Empty: surface return flange mounting as indicated.
- .3 Type T Terminal: surface return flange mounting as indicated containing 19 mm G1S plywood backboard.

Part 3 Execution

3.1 SPLITTER INSTALLATION

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

3.2 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.

- .2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.
- .3 Install terminal block in Type T cabinets.
- .4 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.3 IDENTIFICATION

- .1 Equipment Identification: to Section 26 05 00- Common Work Results for Electrical .
- .2 Identification Labels: size 2 indicating voltage and phase or as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA C22.2 No. 18.1-13, Metallic Outlet Boxes.
 - .2 CSA C22.2 No. 45-07(R2012), Rigid Metal Conduit.
 - .3 CSA C22.2 No. 56-13, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .4 CSA C22.2 No. 83-M1985(R2013), Electrical Metallic Tubing.
 - .5 CSA C22.2 No. 211.2-06(R2011), Rigid PVC (Unplasticized) Conduit.

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, metal, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Construction Manager's Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Engineer.

Part 2 Products

2.1 CABLES AND REELS

- .1 Provide cables on reels or coils.
 - .1 Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- .2 Each coil or reel of cable to contain only one continuous cable without splices.
- .3 Identify cables for exclusively dc applications.

2.2 CONDUITS

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

- .4 Flexible pvc conduit: to CAN/CSA-C22.2 No. 227.3.

2.3 CONDUIT FASTENINGS

- .1 One hole steel straps to secure surface conduits
50 mm and smaller.
 - .1 Two hole steel straps for conduits larger than 50 mm.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits.
- .4 Threaded rods, 6 mm diameter, to support suspended channels.

2.4 CONDUIT FITTINGS

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

2.5 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 100 mm linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.6 FISH CORD

- .1 Polypropylene.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.
- .3 Surface mount conduits except within partitions.
- .4 Use electrical metallic tubing (EMT) except in cast concrete above 2.4 m not subject to mechanical injury.
- .5 Use rigid pvc conduit underground and in corrosive areas.
- .6 Use flexible metal conduit for connection to motors in dry areas.
- .7 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.
- .8 Use explosion proof flexible connection for connection to explosion proof motors.
- .9 Install conduit sealing fittings in hazardous areas.
 - .1 Fill with compound.
- .10 Minimum conduit size shall be 21mm.
- .11 Bend conduit cold:
 - .1 Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .12 Mechanically bend steel conduit over 19 mm diameter.
- .13 Install fish cord in empty conduits.
- .14 Remove and replace blocked conduit sections.
 - .1 Do not use liquids to clean out conduits.
- .15 Dry conduits out before installing wire.

3.3 CONDUITS IN CAST-IN-PLACE CONCRETE

- .1 Protect conduits from damage where they stub out of concrete.

3.4 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.

- .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .3 Run conduits in flanged portion of structural steel.
- .4 Group conduits wherever possible on channels.
- .5 Do not pass conduits through structural members except as indicated.
- .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.5 CONCEALED CONDUITS

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

3.6 CONDUITS UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (pvc excepted) with heavy coat of bituminous paint.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association, (CSA International)
- .2 Insulated Cable Engineers Association, Inc. (ICEA)

1.2 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Unused sealant material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.
- .5 Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Engineer.

Part 2 Products

2.1 CABLE PROTECTION

- .1 38 x 140 mm planks pressure treated with clear or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.

Part 3 EXECUTION

3.1 CABLE INSTALLATION IN DUCTS

- .1 Install cables as indicated in ducts.
 - .1 Do not pull spliced cables inside ducts.
- .2 Install multiple cables in duct simultaneously.
- .3 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .4 To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.

- .5 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .6 After installation of cables, seal duct ends with duct sealing compound.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Perform tests using qualified personnel. Provide necessary instruments and equipment.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.
- .5 Pre-acceptance tests.
 - .1 After installing cable but before splicing and terminating, perform insulation resistance test with 1000 V megger on each phase conductor.
 - .2 Check insulation resistance after each splice and/or termination to ensure that cable system is ready for acceptance testing.
- .6 Acceptance Tests
 - .1 Ensure that terminations and accessory equipment are disconnected.
 - .2 Ground shields, ground wires, metallic armour and conductors not under test.
 - .3 High Potential (Hipot) Testing.
 - .1 Conduct hipot testing at original factory test voltage in accordance with manufacturer's recommendations.
- .7 Provide Engineer with list of test results showing location at which each test was made, circuit tested and result of each test.
- .8 Remove and replace entire length of cable if cable fails to meet any of test criteria.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA International
 - .1 CAN/CSA-C22.2 No.47-13 Air-Cooled Transformers (Dry Type).
 - .2 CSA C9-02(R2011), Dry-Type Transformers.
 - .3 CAN/CSA-C802.2-12, Minimum Efficiency Values for Dry Type Transformers.
- .2 National Electrical Manufacturers Association (NEMA)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for dry type transformers for incorporation into manual.

Part 2 Products

2.1 DESIGN DESCRIPTION

- .1 Design 1.
 - .1 Type: ANN.
 - .2 Single or 3 phase size, primary and secondary voltage as indicated
 - .3 Voltage taps: standard to 2½% above and 2½% below.
 - .4 Insulation: 150 degrees C temperature rise.
 - .5 Basic Impulse Level (BIL): standard.
 - .6 Hipot: standard.
 - .7 Average sound level: standard
 - .8 Impedance at 170 degrees C: standard
 - .9 Enclosure: CSA Type 2, removable metal front panel.
 - .10 Mounting: floor or wall as indicated.
 - .11 Finish: in accordance with Section 26 05 00 - Common Work Results for Electrical.
 - .12 Copper windings.
 - .13 3 phase shall be true delta-star winding configuration.
 - .14 Voltage Regulation to be 4% or better.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Label size: 7.

Part 3 Execution

3.1 INSTALLATION

- .1 Mount dry type transformers up to 75 kVA as indicated.
- .2 Mount dry type transformers above 75 kVA on floor.
- .3 Ensure adequate clearance around transformer for ventilation.
- .4 Install transformers in level upright position.
- .5 Remove shipping supports only after transformer is installed and just before putting into service.
- .6 Loosen isolation pad bolts until no compression is visible.
- .7 Make primary and secondary connections in accordance with wiring diagram.
- .8 Energize transformers after installation is complete.
- .9 Make conduit entry into bottom 1/3 of transformer enclosure.

3.2 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by dry type transformers installation.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA International
 - .1 CSA C22.2 No.29-11, Panelboards and Enclosed Panelboards.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
 - .1 Include on drawings:
 - .1 Electrical detail of panel, branch breaker type, quantity, ampacity and enclosure dimension.

1.3 CLOSEOUT SUBMITTALS _

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for panelboards for incorporation into manual.

1.4 DELIVERY, STORAGE AND HANDLING

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

Part 2 Products

2.1 PANELBOARDS

- .1 Panelboards: to CSA C22.2 No.29 and product of one manufacturer.
 - .1 Install circuit breakers in panelboards before shipment.
 - .2 In addition to CSA requirements manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
- .2 250 V panelboards: bus and breakers rated for 10,000 A (symmetrical) interrupting capacity or as indicated.
- .3 600 V panelboards: bus and breakers rated for 20,000 A (symmetrical) interrupting capacity or as indicated.
- .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, and number and size of branch circuit breakers as indicated.

- .6 Minimum of 2 flush locks for each panel board.
- .7 Two keys for each panelboard and key panelboards alike.
- .8 Copper bus with neutral of same ampere rating of mains.
- .9 Mains: suitable for bolt-on breakers.
- .10 Trim with concealed front bolts and hinges.
- .11 Trim and door finish: baked enamel.
- .12 CSA Type 1 enclosure in non-sprinklered buildings, CSA Type 2 enclosure in sprinklered buildings.

2.2 BREAKERS

- .1 Breakers: to Section 26 28 16.02 - Moulded Case Circuit Breakers.
- .2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.
- .3 Main breaker: separately mounted on top or bottom of panel to suit cable entry. When mounted vertically, down position should open breaker.

2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Nameplate for each panelboard size 4 engraved as indicated.
- .3 Nameplate for each circuit in distribution panelboards size 2 engraved as indicated.
- .4 Complete circuit directory with typewritten legend showing location and load of each circuit, mounted in plastic envelope at inside of panel door.

Part 3 Execution

3.1 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb, true and square, to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards. Where practical, group panelboards on common backboard.

- .3 Mount panelboards to height specified in Section 26 05 00 - Common Work Results for Electrical or as indicated.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus with respective neutral identified.

3.2 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by panelboards installation.

END OF SECTION

Part 1 General

1.1 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide fuse performance data characteristics for each fuse type and size above 100 A. Performance data to include: average melting time-current characteristics.

1.2 DELIVERY, STORAGE AND HANDLING

- .1 Ship fuses in original containers.
- .2 Do not ship fuses installed in switchboard.
- .3 Store fuses in original containers in moisture free location.

1.3 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Three spare fuses of each type and size installed above 600 A.
- .3 Six spare fuses of each type and size installed up to and including 600 A.

Part 2 Products

2.1 FUSES - GENERAL

- .1 Fuse type references L1, L2, J1, R1, etc. have been adopted for use in this specification.
- .2 Fuses: product of one manufacturer.

2.2 FUSE TYPES

- .1 Class L fuses: use for fuses over 600A.
 - .1 Type L1, time delay, capable of carrying 500% of its rated current for 10 s minimum.
 - .2 Type L2, fast acting.
- .2 Class J fuses: use for fuses 600A and below.
 - .1 Type J1, time delay, capable of carrying 500% of its rated current for 10 s minimum.

Part 3 Execution

3.1 INSTALLATION

- .1 Install fuses in mounting devices immediately before energizing circuit.
- .2 Ensure correct fuses fitted to physically matched mounting devices.
- .3 Ensure correct fuses fitted to assigned electrical circuit.
- .4 Install spare fuses in fuse storage cabinet.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA International
 - .1 CSA C22.2 No. 5-13, Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, and NMX-J-266-ANCE-2010).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for circuit breakers and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Include time-current characteristic curves for breakers with ampacity of 100 A and over or with interrupting capacity of 20,000 A symmetrical (rms) and over at system voltage.
- .4 Certificates:
 - .1 Prior to installation of circuit breakers in either new or existing installation, Contractor must submit 3 copies of a production certificate of origin from the manufacturer. Production certificate of origin must be duly signed by factory and local manufacturer's representative certifying that circuit breakers come from this manufacturer and are new and meet standards and regulations.
 - .1 Production certificate of origin must be submitted to Departmental Representative for approval.
 - .2 Delay in submitting production of certificate of origin will not justify any extension of contract and additional compensation.
 - .3 Any work of manufacturing, assembly or installation to begin only after acceptance of production certificate of origin by Departmental Representative. Unless complying with this requirement, Departmental Representative reserves the right to mandate manufacturer listed on circuit breakers to authenticate new circuit breakers under the contract, and to Contractor's expense.
 - .4 Production certificate of origin must contain:
 - .1 Manufacturer's name and address and person responsible for authentication. Person responsible must sign and date certificate.
 - .2 Licensed dealer's name and address and person of distributor responsible for Contractor's account.
 - .3 Contractor's name and address and person responsible for project.

- .4 Local manufacturer's representative name and address. Local manufacturer's representative must sign and date certificate.
- .5 Name and address of building where circuit breakers will be installed:
 - .1 Project title
 - .2 End user's reference number.
 - .3 List of circuit breakers.

Part 2 Products

2.1 BREAKERS GENERAL

- .1 Moulded-case circuit breakers and ground-fault circuit-interrupters: to CSA C22.2 No. 5
- .2 Bolt-on moulded case circuit breaker: quick- make, quick-break type, for manual and automatic operation with temperature compensation for 40 degrees C ambient.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting.
 - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers with interchangeable trips.
- .6 Circuit breakers to have minimum symmetrical rms interrupting capacity rating to match panels in which they are to be installed.

2.2 THERMAL MAGNETIC BREAKERS

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

2.3 OPTIONAL FEATURES

- .1 Include:
 - .1 Shunt trip.
 - .2 On-off locking device.

Part 3 Execution

3.1 INSTALLATION

- .1 Install circuit breakers as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 CSA Group
 - .1 CAN/CSA-C22.2 No.4-04(R2009), Enclosed and Dead-Front Switches (Tri-National Standard, with ANCE NMX-J-162-2004 and UL 98).
 - .2 CSA C22.2 No.39-13, Fuseholder Assemblies.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal procedures.
- .2 Product Data:
 - .1 Submit manufacturer`s instructions, printed product literature and data sheets for disconnect switches – fused and non-fused and include product characteristics, performance criteria, physical size, finish and limitations.

Part 2 Products

2.1 DISCONNECT SWITCHES

- .1 Fusible, Non-fusible, Horsepower rated disconnect switch in CSA enclosure 2, to CAN/CSA-C22.2 No.4 size as indicated.
- .2 Provision for padlocking in on-off switch position by 3 locks.
- .3 Mechanically interlocked door to prevent opening when handle in ON position.
- .4 Fuses: size as indicated, in accordance with Section 26 28 13.01 - Fuses - Low Voltage.
- .5 Fuseholders: to CSA C22.2 No.39relocatable and 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.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Indicate name of load controlled on size 4 nameplate.

Part 3 Execution

3.1 INSTALLATION

- .1 Install disconnect switches complete with fuses if applicable.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .1 ANSI/IEEE C62.41-[1991], Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- .2 ASTM International Inc.
 - .1 ASTM F 1137-[00(2006)], Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .3 Canadian Standards Association (CSA International)
- .4 ICES-005-[07], Radio Frequency Lighting Devices.
- .5 Underwriters' Laboratories of Canada (ULC)

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental representative.
 - .3 Photometric data to include: VCP Table.
- .3 Quality assurance submittals: provide following in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .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 74 21 - Construction/Demolition Waste Management and Disposal.
- .4 Divert unused metal materials from landfill to metal recycling facility.
- .5 Disposal and recycling of lamps as per local regulations.
- .6 Disposal of old PCB filled ballasts.

Part 2 Products

2.1 LAMPS

- .1 Light emitting diode (LED) equipment for lighting applications: to CSA C22.2No.250.13-12.
- .2 Performance of LED luminaires: to CSA C866-12.
- .3 Provide all required lamps as indicated in fixture list.

2.2 DRIVERS

- .1 Provide LED drivers and accessories as indicated.

2.3 FINISHES

- .1 Light fixture finish and construction to meet ULC listing[s] and CSA certification[s] related to intended installation.

2.4 OPTICAL CONTROL DEVICES

- .1 As indicated in luminaire schedule.

2.5 LUMINAIRES

- .1 As indicated in luminaire schedule.
- .2 Provide gaskets, stops and barriers to form light traps to prevent light leaks.

Part 3 Execution

3.1 INSTALLATION

- .1 Locate and install luminaires as indicated plans.
- .2 Provide concrete bases for new poles as indicated on drawings.
- .3 Install fixtures on poles and secure poles to new concrete bases as indicated on drawings.
- .4 Ensure poles and fixtures are properly embedded in earth to accommodate wind load.

3.2 WIRING

- .1 Connect luminaires to lighting circuits.

3.3 LUMINAIRE ALIGNMENT

- .1 Align luminaires to form straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.

3.4 CLEANING

- .1 Clean in accordance with Section 01 74 11 - Cleaning.
 - .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 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA C22.2 No.206-M1987(R1999), Lighting Poles.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

1.3 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .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 in accordance with Waste Management Plan.
- .4 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Departmental Representative.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 ALUMINUM POLES

- .1 Aluminum poles: to CSA C22.2 No.206 designed for underground wiring and:
 - .1 Mounting on concrete anchor base.
 - .2 Style: Monotube, round tapered G063-T6 aluminum, wall thickness 6 mm.
 - .3 Straight for one or multiple luminaire mounting brackets.
 - .4 Tapered davit for one or multiple luminaires.
 - .5 Access handhole above pole base for wiring connections, with welded-on reinforcing frames bolted-on cover.
 - .6 Size: as indicated in luminaire schedule.
 - .7 Anchor bolts: steel with shims, nuts, washers and covers.
 - .8 Finish: as indicated in luminaire schedule.
 - .9 Grounding lug.

2.2 LUMINAIRE MOUNTING BRACKETS

- .1 Mounting brackets aluminum for specified luminaires:
 - .1 Single or multiple brackets as indicated.
 - .2 Arm extension length: as indicated in luminaire schedule.

- .3 Tapered davit type.

2.3 LUMINAIRES

- .1 Luminaire with weatherproof housing and:
 - .1 Lamp type: LED, wattage: as indicated in luminaire schedule.
 - .2 Drivers: 347 V, in accordance with Section 26 50 00 - Lighting.
 - .3 Optical assembly:
 - .1 For LED lamps:
 - .1 Refractor: one piece prismatic virgin acrylic.
 - .2 Gasket: neoprene seal between each LED and housing.
 - .4 Light Distribution:
 - .1 IES distribution Type as indicated in luminaire schedule.
 - .5 Self-locking latches of stainless steel and aluminum.
 - .6 Factory wired including integral driver terminated at terminal block.

Part 3 Execution

3.1 INSTALLATION

- .1 Install poles true and plumb, complete with brackets in accordance with manufacturer's instructions.
- .2 Install luminaires on pole davits.
- .3 Check luminaire orientation, level and tilt.
- .4 Connect luminaire to lighting circuit.
- .5 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .2 Section 32 91 19.13 – Topsoil Placement and Grading.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM) International
 - .1 ASTM D 698-7e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600kN-m/m³).
- .2 CSA International
 - .1 CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1004 (November 2012), Material Specification for Aggregates-Miscellaneous.
 - .2 OPSS 1010 (April 2013), Material Specification for Aggregates - Base, Subbase, Select Subgrade, and Backfill Material.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Erosion and Sedimentation Control: submit erosion and sedimentation control plan in accordance with authorities having jurisdiction.

Part 2 Products

2.1 MATERIALS

- .1 Granular A, B Type II, Select Subgrade to OPSS.
- .2 Unshrinkable fill: concrete to CSA A23.1/A23.2.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions:

- .1 Before commencing work establish locations of buried services on and adjacent to site.
- .2 Evaluation and Assessment:
 - .1 Arrange with appropriate authority for relocation of buried services that interfere with execution of Work. Pay costs of relocating services.
 - .2 Testing of materials and compaction of backfill and fill will be carried out by testing laboratory designated by Departmental Representative.
 - .3 Not later than 1 week before backfilling or filling, provide to designated testing agency, 23 kg sample of backfill and fill materials proposed for use.
 - .4 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative so that compaction tests can be carried out by designated testing agency.
 - .5 Before commencing work, conduct, with Departmental Representative, condition survey of existing structures, trees and plants, lawns, fencing, servicing poles, wires, rail tracks and paving, survey bench marks and monuments which may be affected by work.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Use temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, in accordance with sediment and erosion control plan, specific to site, to EPA 832/R-92-005 and requirements of authorities having jurisdiction.
 - .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
 - .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- .2 Protection of in-place conditions:
 - .1 Protect excavations from freezing.
 - .2 Keep excavations clean, free of standing water, and loose soil.
 - .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.
 - .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
 - .5 Protect buried services that are to remain undisturbed.
- .3 Removal:
 - .1 Remove obsolete buried services within 2m of foundations. Cap cut-offs.
 - .2 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

- .3 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.
- .4 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within areas designated on drawings.
- .5 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.

3.3 EXCAVATION

- .1 Topsoil stripping:
 - .1 Do not handle topsoil while in wet or frozen condition or in any manner in which soil structure is adversely affected.
 - .2 Strip topsoil to depths as directed by Departmental Representative. Avoid mixing topsoil with subsoil.
 - .3 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.
 - .4 Stockpile in locations as directed by Departmental Representative.
- .2 Excavate as required to carry out work, in all materials met.
 - .1 Do not disturb soil or rock below bearing surfaces. Notify Departmental Representative when excavations are complete.
 - .2 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.
 - .3 Fill excavation taken below depths shown without Departmental Representative's written authorization with concrete of same strength as for footings.
- .3 Excavate trenches to provide uniform continuous bearing and support for 150 mm thickness of pipe bedding material on solid and undisturbed ground. Trench widths below point 150 mm above pipe not to exceed diameter of pipe plus 600 mm.
- .4 Excavate for slabs and paving to subgrade levels.
 - .1 Remove topsoil, organic matter, debris and other loose and harmful matter encountered at subgrade level.

3.4 SITE QUALITY CONTROL

- .1 Fill material and spaces to be filled to be inspected and approved by Departmental Representative.

3.5 BACKFILLING

- .1 Start backfilling only after inspection and receipt of written approval of fill material and spaces to be filled from Departmental Representative.

- .2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .3 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .4 Compaction of subgrade: compact existing subgrade under walks, paving, and slabs on grade, to same compaction as specified for fill. Fill excavated areas with selected subgrade material compacted as specified for fill.
- .5 Placing:
 - .1 Place backfill, fill and basecourse material in 150 mm lifts. Add water as required to achieve specified density.
 - .2 Place unshrinkable fill in areas as indicated. Consolidate and level unshrinkable fill with internal vibrators.
- .6 Compaction: compact each layer of material to densities as indicated in the geotechnical report or to ASTM D 698 if not otherwise indicated:
 - .1 To underside of basecourses: 95%.
 - .2 Basecourses: 100%.
 - .3 Elsewhere: 90%.
- .7 Under slabs and paving:
 - .1 Use native backfill up to bottom of granular base courses.
 - .2 Use the following for granular courses:
 - .1 Sub-base: minimum 300 mm Granular B Type II.
 - .2 Base: 150 mm Granular A.
- .8 In trenches:
 - .1 Up to 300 mm above pipe or conduit: sand or granular material as directed by Departmental Representative.
 - .2 Over 300 mm above pipe or conduit: native material approved by Departmental Representative.
- .9 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.
- .10 Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.

3.6 GRADING

- .1 Grade to ensure that water will drain away from buildings, walls and paved areas, to catch basins and other disposal areas approved by Departmental Representative. Grade to be gradual between finished spot elevations as indicated.

3.7 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Dispose of cleared and grubbed material off site daily.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 23 33.01 – Excavation, Trenching and Backfilling.
- .2 Section 32 11 16.01 – Granular Sub-Base.
- .3 Section 32 11 23 – Aggregate Base Courses.
- .4 Section 32 12 16.02 – Asphalt Paving for Building Sites.
- .5 Section 03 30 00 – Cast-in-Place Concrete.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Allow continual sampling by Departmental Representative during production.
- .3 Provide Departmental Representative with access to source and processed material for sampling.
- .4 Install sampling to allow Departmental Representative to obtain representative samples of items being produced.
- .5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.
- .6 Provide water, electric power and propane to Departmental Representative laboratory trailer at production site.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert unused granular materials from landfill to local quarry.

Part 2 Products

2.1 MATERIALS

- .1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.
- .2 Flat and elongated particles of coarse aggregate: to ASTM D4791.
 - .1 Greatest dimension to exceed five times least dimension.
- .3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:
 - .1 Natural sand.
 - .2 Manufactured sand.
 - .3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.
- .4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:
 - .1 Crushed rock.
 - .2 Gravel and crushed gravel composed of naturally formed particles of stone.
 - .3 Light weight aggregate, including slag and expanded shale.

2.2 SOURCE QUALITY CONTROL

- .1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.
- .2 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.
- .3 Advise Departmental Representative 4 weeks in advance of proposed change of material source.
- .4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 PREPARATION

- .1 Aggregate source preparation

- .1 Prior to excavating materials for aggregate production, clear and grub area to be worked, and strip unsuitable surface materials. Dispose of cleared, grubbed and unsuitable materials as directed by Departmental Representative.
 - .2 Where clearing is required, leave screen of trees between cleared area and roadways as directed.
 - .3 Clear, grub and strip area ahead of quarrying or excavating operation sufficient to prevent contamination of aggregate by deleterious materials.
 - .4 When excavation is completed dress sides of excavation to nominal 1.5:1 slope, and provide drains or ditches as required to prevent surface standing water.
 - .5 Trim off and dress slopes of waste material piles and leave site in neat condition.
- .2 Processing
- .1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.
 - .2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.
 - .3 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.
 - .4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.
- .3 Handling
- .1 Handle and transport aggregates to avoid segregation, contamination and degradation.
- .4 Stockpiling
- .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
 - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
 - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 h of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1.5 m for coarse aggregate and base course materials.
 - .2 Max 1.5 m for fine aggregate and sub-base materials.
 - .3 Max 1.5 m for other materials.

- .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .9 Do not cone piles or spill material over edges of piles.
- .10 Do not use conveying stackers.
- .11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

- .1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.
- .2 Leave any unused aggregates in neat compact stockpiles as directed by Departmental Representative.
- .3 For temporary or permanent abandonment of aggregate source, restore source to condition meeting requirements of authority having jurisdiction.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 00 99 – Earthwork for Minor Works.

1.2 MEASUREMENT PROCEDURES

- .1 No measurement for payment will be made under this Section. Work performed under this Section will be incidental to work in other related sections.

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM D698-00a, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (600 kN-m/m³).

1.4 DEFINITIONS

- .1 Reshaping subgrade: scarifying, pulverizing, blading, reshaping and recompacting existing subgrade surface.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 SCARIFYING AND RESHAPING

- .1 Pulverize and break down scarified material to 25 mm maximum soil clod size, except that stones larger than this size may be left intact as directed by Departmental Representative.
- .2 Blade and trim pulverized material to elevation and cross section dimensions as indicated.
- .3 Where deficiency of material exists, add and blend additional subgrade material as directed by Departmental Representative.
- .4 Re-use excess material in areas of material deficiency as directed by Departmental Representative.

3.2 COMPACTING

- .1 Compact to density not less than 100% maximum dry density in accordance with ASTM D698 or as indicated in the geotechnical report.
- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted subgrade surface.
- .3 Apply water as necessary during compaction to obtain specified density.
- .4 If material is excessively moist, aerate by scarifying with suitable equipment until moisture content is corrected to value not greater than in accordance with ASTM D698.

3.3 SITE TOLERANCES

- .1 Reshaped compacted surface to be within plus or minus 10mm of elevation as indicated.

3.4 PROTECTION

- .1 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until Departmental Representative acceptance.

3.5 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 35 29.06 - Health and Safety Requirements.
- .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling.

1.2 MEASUREMENT PROCEDURES

- .1 Quantities will be taken from cross section showing original rock surface and actual grade line set by Departmental Representative.

1.3 REFERENCES

- .1 Definitions:
 - .1 Rock: any solid material in excess of 1.0 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.

1.4 QUALITY ASSURANCE

- .1 Monitoring:
 - .1 Departmental Representative will visit property holders of adjacent buildings and structures to determine existing conditions and describe rock removal operations and obtain their permission for setting up, if required.
- .2 Vibration Control:
 - .1 Reduce ground vibrations to avoid damage to structures or remaining rock mass.

Part 2 Products

2.1 MATERIALS

- .1 Not used.

Part 3 Execution

3.1 ROCK REMOVAL

- .1 Perform excavation in accordance with Erosion and Sedimentation Control Plan.
- .2 Co-ordinate this Section with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Remove rock to alignments, profiles, and cross sections as indicated.

- .4 Explosive blasting is not permitted.
- .5 Use rock removal procedures to produce uniform and stable excavation surfaces. Minimize overbreak, and to avoid damage to adjacent structures.
- .6 Excavate rock to horizontal surfaces with slope not to exceed 1H:4V.
- .7 Prepare rock surfaces which are to bond to concrete, by scaling, pressure washing and broom cleaning surfaces.
- .8 Excavate trenches to lines and grades to minimum of 300 mm below pipe invert indicated. Provide recesses for bell and spigot pipe to ensure bearing will occur uniformly along barrel of pipe.
- .9 Cut trenches to widths as indicated.
- .10 Remove boulders and fragments which may slide or roll into excavated areas.
- .11 Correct unauthorized rock removal at no extra cost, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

3.2 ROCK DISPOSAL

- .1 Dispose of surplus removed rock off site.
- .2 Do not dispose removed rock into landfill. Material must be sent to appropriate quarry.

END OF SECTION

Part 1 General**1.1 RELATED SECTIONS**

- .1 Section 01 35 43 – Environmental Procedures.
- .2 Section 01 51 00 – Temporary Utilities.
- .3 Section 31 00 99 - Earthwork for Minor Works.
- .4 Section 31 05 16 – Aggregate Materials.
- .5 Section 33 05 13 – Manholes and Catch Basin Structures.
- .6 Section 33 41 00 – Storm Utility Drainage Piping.

1.2 MEASUREMENT PROCEDURES

- .1 No Measurement for payment will be made under this Section. Work performed under this Section will be incidental to work in other related Sections.

1.3 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D422-63 2002, Standard Test Method for Particle-Size Analysis of Soils.
 - .4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ;) (600 kN-m/m ;).
 - .5 ASTM D1557-02e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ;) (2,700 kN-m/m ;).
 - .6 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
- .3 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
 - .1 CSA-A3001-03, Cementitious Materials for Use in Concrete.

- .2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.4 DEFINITIONS

- .1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.
 - .1 Rock: solid material in excess of 1.0 m³ and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m³ bucket. Frozen material not classified as rock.
 - .2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.
- .2 Unclassified excavation: excavation of deposits of whatever character encountered in Work.
- .3 Topsoil:
 - .1 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.
 - .2 Material reasonably free from subsoil, clay lumps, brush, objectionable weeds, and other litter, and free from cobbles, stumps, roots, and other objectionable material larger than 25 millimeters in any dimension.
- .4 Waste material: excavated material unsuitable for use in Work or surplus to requirements.
- .5 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.
- .6 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .7 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.1.
 - .2 Coarse grained soils containing more than 20% by mass passing 0.075 mm sieve.
- .8 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality Control: in accordance with Section 01 45 00 - Quality Control:

- .1 Submit condition survey of existing conditions.
 - .2 Submit for review by Departmental Representative proposed dewatering and heave prevention methods.
 - .3 Submit to Departmental Representative written notice at least 5 days prior to excavation work, to ensure cross sections are taken.
 - .4 Submit to Departmental Representative written notice when bottom of excavation is reached.
 - .5 Submit to Departmental Representative testing results and report.
- .3 Preconstruction Submittals:
- .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
 - .2 Submit records of underground utility locates, indicating: location plan of relocated and abandoned services, as required.
- .4 Samples:
- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Inform Departmental Representative at least 4 weeks prior to beginning Work, of proposed source of fill and unshrinkable fill materials and provide access for sampling.
 - .3 At least 4 weeks prior to beginning Work, inform Departmental Representative source of fly ash and submit samples to Departmental Representative.
 - .1 Do not change source of Fly Ash without written approval of Departmental Representative.

1.6 QUALITY ASSURANCE

- .1 Qualification Statement: submit proof of insurance coverage for professional liability.
- .2 Where Departmental Representative is employee of Contractor, submit proof that Work by Departmental Representative is included in Contractor's insurance coverage.
- .3 Submit design and supporting data at least 2 weeks prior to beginning Work.
- .4 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.
- .5 Keep design and supporting data on site.
- .6 Engage services of qualified professional Engineer who is registered or licensed in Province of Ontario, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.
- .7 Do not use soil material until written report of soil test results are reviewed and approved by Departmental Representative.
- .8 Health and Safety Requirements:

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Divert excess materials from landfill to local quarry for reuse.

1.8 EXISTING CONDITIONS

- .1 Buried services:
 - .1 Before commencing work establish location of buried services on and adjacent to site.
 - .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
 - .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
 - .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
 - .5 Prior to beginning excavation Work, notify authorities, including Departmental Representative, and state of use of buried utilities and structures. Clearly mark such locations to prevent disturbance during Work.
 - .6 Confirm locations of buried utilities by careful soil hydrovac methods.
 - .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.
 - .8 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing. Costs for such Work to be paid by Contractor.
 - .9 Record location of maintained, re-routed and abandoned underground lines.
 - .10 Confirm locations of recent excavations adjacent to area of excavation.
- .2 Existing buildings and surface features:
 - .1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, rail tracks, pavement, survey bench marks and monuments which may be affected by Work.
 - .2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.
 - .3 Where required for excavation, cut roots or branches as directed by Departmental Representative in accordance with Section 32 01 90.33 - Tree and Shrub Preservation.

Part 2 Products**2.1 MATERIALS**

- .1 Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

Part 3 Execution**3.1 SITE PREPARATION**

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly.

3.2 PREPARATION/PROTECTION

- .1 Protect existing features in accordance with applicable local regulations.
- .2 Keep excavations clean, free of standing water, and loose soil.
- .3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative approval.
- .4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.
- .5 Protect buried services that are required to remain undisturbed.

3.3 STOCKPILING

- .1 Stockpile fill materials in areas designated by Departmental Representative.
 - .1 Stockpile granular materials in manner to prevent segregation.
- .2 Protect fill materials from contamination.
- .3 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies.

3.4 DEWATERING AND HEAVE PREVENTION

- .1 Keep excavations free of water while Work is in progress.

- .2 Provide for Departmental Representative's approval details of proposed dewatering or heave prevention methods, including dikes, well points, and sheet pile cut-offs.
- .3 Avoid excavation below groundwater table if quick condition or heave is likely to occur.
 - .1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.
- .4 Protect open excavations against flooding and damage due to surface run-off.
- .5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures to approved manner not detrimental to public and private property, or portion of Work completed or under construction.
 - .1 Provide and maintain temporary drainage ditches and other diversions outside of excavation limits.

3.5 EXCAVATION

- .1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.
- .2 Excavate to lines, grades, elevations and dimensions as indicated.
- .3 Remove concrete, paving, walks, curbs and other obstructions encountered during excavation as indicated.
- .4 Excavation must not interfere with bearing capacity of adjacent foundations.
- .5 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.
- .6 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.
- .7 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.
- .8 Restrict vehicle operations directly adjacent to open trenches.
- .9 Dispose of surplus and unsuitable excavated material off site.
- .10 Do not obstruct flow of surface drainage or natural watercourses.
- .11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .12 Notify Departmental Representative when bottom of excavation is reached.
- .13 Obtain Departmental Representative approval of completed excavation.

- .14 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.
- .15 Correct unauthorized over-excavation as follows:
 - .1 Fill under bearing surfaces and footings with Type 2 fill compacted to not less than 100% of corrected Standard Proctor maximum dry density.
 - .2 Fill under other areas with Type 2 fill compacted to not less than 95 % of corrected Standard Proctor maximum dry density.
- .16 Hand trim, make firm and remove loose material and debris from excavations.
 - .1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.
 - .2 Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

3.6 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698 / ASTM D1557.
 - .1 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100%.

3.7 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.

3.8 BACKFILLING

- .1 Vibratory compaction equipment:
- .2 Do not proceed with backfilling operations until completion of following:
 - .1 Departmental Representative has inspected and approved installations.
 - .2 Departmental Representative has inspected and approved of construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
- .3 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .4 Do not use backfill material which is frozen or contains ice, snow or debris.
- .5 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .6 Backfilling around installations:

- .1 Place bedding and surround material as specified elsewhere.
- .2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.
- .3 Place layers simultaneously on both sides of installed Work to equalize loading.

3.9 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management and Disposal, trim slopes, and correct defects as directed by Departmental Representative.
- .2 Replace topsoil as indicated.
- .3 Reinstate lawns to elevation which existed before excavation.
- .4 Reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation up to 1.0m beyond the excavation limits.
- .5 Clean and reinstate areas affected by Work as directed by Departmental Representative.
- .6 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours.
- .7 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CSA G30.5-M1983 (R1998), Welded Steel Wire Fabric for Concrete Reinforcement.
- .2 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
 - .2 Fertilizers Act (R.S. 1985, c. F-10).
 - .3 Fertilizers Regulations (C.R.C., c. 666).
 - .4 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.
- .3 Health Canada - Pest Management Regulatory Agency (PMRA)
 - .1 National Standard for Pesticide Education, Training and Certification in Canada (1995).
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).

1.2 MEASUREMENT FOR PAYMENT

- .1 No measurement for payment will be made under this Section. Work performed under this Section will be incidental to work in other related Sections.

1.3 DEFINITION

- .1 Mycorrhiza: association between fungus and roots of plants. This symbiosis, enhances plant establishment in newly landscaped and imported soils.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

1.5 SCHEDULING

- .1 Obtain approval Departmental Representative of schedule indicating beginning of Work.

1.6 MAINTENANCE DURING WARRANTY PERIOD

- .1 From time of acceptance by Departmental Representative to end of warranty period, perform following maintenance operations.

- .1 Water to maintain soil moisture conditions for optimum growth and health of plant material without causing erosion.
- .2 Apply fertilizer in early spring at rate of 0.025 kg of nitrogen/m².
- .3 Remove dead, broken or hazardous branches from plant material. Dispose of debris offsite.

Part 2 Products

2.1 MATERIALS

- .1 Fill:
 - .1 Type (A): clean, natural river sand and gravel material, free from silt, clay, loam, friable or soluble materials and organic matter.
 - .2 Type (B): excavated soil, free from roots, rocks larger than 75 mm, building debris, and toxic ingredients (salt, oil, etc.). Excavated material shall be approved by Departmental Representative before use as fill.
- .2 Coarse washed stones: 35-75 mm diameter clean round hard stone.
- .3 Fertilizer:
 - .1 To Canada Fertilizer Act and Fertilizers Regulations.
 - .2 Complete, commercial, slow release with 35 % of nitrogen content in water-insoluble form.

Part 3 Execution

3.1 IDENTIFICATION AND PROTECTION

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .2 Identify plants and limits of root systems to be preserved as approved by Departmental Representative.
- .3 Protect plant and root systems from damage, compaction and contamination resulting from construction as approved by Departmental Representative.
- .4 Ensure no pruning is done inside drip line. If pruning inside drip line is required consult an arborist or Canadian Certified Horticultural Technician (CCHT) as approved by Departmental Representative.

3.2 TRENCHING AND TUNNELING FOR UNDERGROUND SERVICES

- .1 Centre line location and limits of trench/tunnel excavation to be approved by Departmental Representative prior to excavation. Tunnel excavation to extend 2000 mm from edge of trunk on either side.

- .2 Excavate manually within zone of root system. Do not sever roots greater than 40 mm diameter except at greater than 500 mm below existing grade. Protect roots, and cut roots cleanly with sharp disinfected tools.
- .3 Excavate tunnel under centre of tree trunk using methods and equipment approved by Departmental Representative.
- .4 Minimum acceptable depth to top of tunnel: 1000 mm.
- .5 Backfill for tunnel and trench to 85% Standard Proctor Density. Avoid damage to trunk and roots of tree.
- .6 Complete tunnelling and backfilling at tree within 2 weeks of beginning Work.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 31 22 16.13 – Roadway Subgrade Reshaping.
- .3 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .4 Section 32 11 23 – Aggregate Base Courses.

1.2 MEASUREMENT PROCEDURES

- .1 No measurement for payment will be made under this Section. Work performed under this Section will be incidental to work in other related Sections.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D422-63 (1998), Standard Test Method for Particle-Size Analysis of Soils.
 - .5 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .6 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .7 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .8 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Divert unused granular material from landfill to local quarry as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand to OPSS Granular B Type II specifications.
 - .2 Gradations to be within OPSS limits.

Part 3 Execution

3.1 PLACING

- .1 Place granular sub-base after subgrade is inspected and approved by Departmental Representative.
- .2 Construct granular sub-base to depth and grade in areas indicated.
- .3 Ensure no frozen material is placed.
- .4 Place material only on clean unfrozen surface, free from snow or ice.
- .5 Place granular sub-base materials using methods which do not lead to segregation or degradation.
- .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
- .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
- .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
- .9 Remove and replace portion of layer in which material has become segregated during spreading.

3.2 COMPACTION

- .1 Compaction equipment to be capable of obtaining required material densities.
- .2 Efficiency of equipment not specified to be proved at least as efficient as specified equipment at no extra cost and written approval must be received from Departmental Representative before use.
- .3 Equipped with device that records hours of actual work, not motor running hours.

- .4 Compact to density of not less than 98% maximum dry density in accordance with ASTM D698 / ASTM D1557.
- .5 Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .6 Apply water as necessary during compaction to obtain specified density.
- .7 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.
- .8 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.3 PROOF ROLLING

- .1 For proof rolling use standard roller of 45400 kg gross mass with four pneumatic tires each carrying 11350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm maximum.
- .2 Obtain approval from Departmental Representative to use non-standard proof rolling equipment.
- .3 Proof roll at level in sub-base as indicated. If non-standard proof rolling equipment is approved, Departmental Representative to determine level of proof rolling.
- .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
- .5 Where proof rolling reveals areas of defective subgrade:
 - .1 Remove sub-base and subgrade material to depth and extent as directed by Departmental Representative.
 - .2 Backfill excavated subgrade with common material and compact in accordance with sub-base material and compact in accordance with this section.
 - .3 Replace sub-base material and compact.
- .6 Where proof rolling reveals areas of defective sub-base, remove and replace in accordance with this section at no extra cost.

3.4 SITE TOLERANCES

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

3.5

PROTECTION

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative.

END OF SECTION

Part 1 General

1.1 MEASUREMENT PROCEDURES

- .1 No measurement for payment will be made under this Section. Work performed under this Section will be incidental to work in other related Sections.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves Testing, Woven Wire, Metric.

Part 2 Products

2.1 MATERIALS

- .1 Granular base material: to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed stone or gravel consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material and other deleterious materials to OPSS Granular A specifications.
 - .2 Graduations within limits specified when tested.

Part 3 Execution

3.1 SEQUENCE OF OPERATION

- .1 Scarifying and reshaping:
 - .1 Scarify roadbed to width as indicated unless directed otherwise by Departmental Representative.
 - .2 Pulverize and break down scarified material to 40 mm maximum particle size.
 - .3 Blade and trim pulverized material to elevation and cross section dimensions as indicated unless directed otherwise by Departmental Representative.
 - .4 Where deficiency of material exists, add and blend in new granular base material as directed by Departmental Representative. Ensure no frozen material is used.
- .2 Compaction equipment:
 - .1 Compaction equipment capable of obtaining required material densities.
 - .2 Provide Departmental Representative with proof of equipment efficiency for unspecified equipment.
 - .1 Efficiency of proposed equipment equal to specified equipment.
 - .2 Obtain approval Departmental Representative before use.

- .3 Equip with device that records hours of actual work, not motor running hours.
 - .3 Compacting:
 - .1 Compact to density minimum 100 corrected maximum dry density in accordance with ASTM D698.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compaction to obtain specified density.
 - .4 Use mechanical tampers, approved by Departmental Representative to compact areas not accessible to rolling equipment to specified density.
 - .4 Repair of soft areas:
 - .1 Correct soft areas by removing defective material to depth and extent directed by Departmental Representative. Replace with material acceptable to Departmental Representative and compact to specified density.
 - .2 Maintain reshaped surface in condition conforming to this section until succeeding material is applied or until acceptance by Departmental Representative.
- 3.2 SITE TOLERANCES**
- .1 Reshaped compacted surface within plus or minus 10 mm of elevation as indicated.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 32 11 16.01 - Granular Sub-Base.
- .3 Section 32 11 17 – Reshaping Granular Roadbed.

1.2 MEASUREMENT PROCEDURES

- .1 Included in Balance of Project.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
 - .2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver and stockpile aggregates in accordance with Section 31 05 16 - Aggregate Materials.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

- .2 Divert unused granular material from landfill to local quarry as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed stone or gravel to OPSS Granular A specifications.
 - .2 Gradations to be within OPSS limits.

Part 3 Execution

3.1 SEQUENCE OF OPERATION

- .1 Place granular base after sub-base surface is inspected and approved by Departmental Representative.
- .2 Placing
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
 - .5 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Departmental Representative may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .6 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .7 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment
 - .1 Compaction equipment to be capable of obtaining required material densities.
- .4 Compacting
 - .1 Compact to density not less than 100% maximum dry density in accordance with ASTM D698/D1557.
 - .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
 - .3 Apply water as necessary during compacting to obtain specified density.
 - .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Departmental Representative.

- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

3.2 SITE TOLERANCES

- .1 Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

3.3 PROTECTION

- .1 Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 32 12 16.02 – Asphalt Paving for Building Sites.

1.2 MEASUREMENT PROCEDURES

- .1 No measurement for payment will be made under this Section. Work performed under this Section will be incidental to work in other related Sections.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D140-01, Standard Practice for Sampling Bituminous Materials.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-16.2-M89, Emulsified Asphalts, Anionic Type, for Road Purposes.

1.4 SUBMITTALS

- .1 Provide access on tank truck for Departmental Representative to sample asphalt material to be incorporated into Work, in accordance with ASTM D140.

1.5 QUALITY ASSURANCE

- .1 Upon request by Owner, submit manufacturer's test data and certification that asphalt tack coat material meets requirements of this section.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with ASTM D140.
- .2 Provide, maintain and restore asphalt storage area.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .2 Divert unused asphalt from landfill to facility capable of recycling materials.

Part 2 Products

2.1 MATERIALS

- .1 Anionic emulsified asphalt: to CAN/CGSB-16.2, grade: SS-1.

- .2 Water: clean, potable, free from foreign matter.

2.2 EQUIPMENT

- .1 Pressure distributor to be:
 - .1 Designed, equipped, maintained and operated so that asphalt material can be:
 - .1 Maintained at even temperature.
 - .2 Applied uniformly on variable widths of surface up to 5 m.
 - .3 Applied at readily determined and controlled rates from 0.2 to 5.4 L/m² with uniform pressure, and with an allowable variation from any specified rate not exceeding 0.1 L/m².
 - .4 Distributed in uniform spray without atomization at temperature required.
 - .2 Equipped with meter, registering metres of travel per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
 - .3 Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.
 - .4 Equipped with an easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
 - .5 Equipped with accurate volume measuring device or calibrated tank.
 - .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
 - .7 Equipped with nozzle spray bar, with operational height adjustment.
 - .8 Cleaned if previously used with incompatible asphalt material.

Part 3 Execution

3.1 APPLICATION

- .1 Obtain Departmental Representative's approval of surface before applying asphalt tack coat.
- .2 Apply asphalt tack coat only on clean and dry surface.
- .3 Dilute asphalt emulsion with water at 1:1 ratio for application.
 - .1 Mix thoroughly by pumping or other method approved by Departmental Representative.
- .4 Apply asphalt tack coat evenly to pavement surface and do not to exceed 0.7 L/m².
- .5 Paint contact surfaces of curbs, gutters, headers, manholes and like structures with thin, uniform coat of asphalt tack coat material.

- .6 Do not apply asphalt tack coat when air temperature is less than 10 degrees C or when rain is forecast within 2 hours of application.
- .7 Apply asphalt tack coat only on unfrozen surface.
- .8 Evenly distribute localized excessive deposits of tack coat by brooming as directed by Departmental Representative.
- .9 Where traffic is to be maintained, treat no more than one half of width of surface in one application.
- .10 Keep traffic off tacked areas until asphalt tack coat has set.
- .11 Re-tack contaminated or disturbed areas as directed by Departmental Representative.
- .12 Permit asphalt tack coat to set before placing asphalt pavement.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 32 12 13.16 - Asphalt Tack Coats.

1.2 MEASUREMENT PROCEDURES

- .1 Included in Balance of Project.

1.3 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit asphalt concrete mix design to Departmental Representative for approval.
- .3 Materials to be tested by testing laboratory approved by Departmental Representative.
- .4 Submit test certificates showing suitability of materials at least 4 weeks prior to commencing work.
- .5 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .6 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing work.
- .7 Submit samples of following materials proposed for use at least 4 weeks prior to commencing work:
 - .1 One (1) 5 L container of asphalt cement.

Part 2 Products

2.1 MATERIALS

- .1 Granular base and sub-base material: to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Crushed or screened stone, gravel or sand to OPSS Granular A and B Type II specifications.
 - .2 Gradations: within OPSS limits.
- .2 Mineral filler for asphalt concrete:
 - .1 Shall be according to OPSS 1003.
- .3 Asphalt cement: performance graded asphalt cement per OPSS 1101.

- .4 Asphalt prime: to CAN/CGSB-16.1, grade RM-20 CAN/CGSB-16.2, grade SS-1.
- .5 Sand blotter: clean granular material passing 4.75 mm sieve and free from organic matter or other deleterious materials.
- .6 Asphalt tack coat: to CAN/CGSB-16.2, grade SS-1.

2.2 EQUIPMENT

- .1 Pavers: mechanical grade controlled self-powered pavers capable of spreading mix within specified tolerances, true to line, grade and crown indicated.
- .2 Rollers: sufficient number of rollers of type and weight to obtain specified density of compacted mix.
- .3 Vibratory rollers for parking lots and driveways:
 - .1 Minimum drum diameter: 750 mm.
 - .2 Maximum amplitude of vibration (machine setting): 0.5 mm for lifts less than 40 mm thick.
- .4 Haul trucks: of sufficient number and of adequate size, speed and condition to ensure orderly and continuous operation and as follows:
 - .1 Boxes with tight metal bottoms.
 - .2 Covers of sufficient size and weight to completely cover and protect asphalt mix when truck fully loaded.
 - .3 In cool weather or for long hauls, insulate entire contact area of each truck box.
- .5 Suitable hand tools.

2.3 MIX DESIGN

- .1 Mix design to OPSS 1151.04.02.
- .2 Job mix formula to be approved by Departmental Representative.
- .3 Do not change job-mix without prior approval of Departmental Representative. When change in material source proposed, new job-mix formula to be approved by Departmental Representative.

Part 3 Execution

3.1 SUBGRADE SURFACE PREPARATION AND INSPECTION

- .1 Verify grades of items set in paving area for conformity with elevations and sections before placing granular base and sub-base material.

- .2 Obtain approval of subgrade by Departmental Representative before placing granular sub-base and base.

3.2 GRANULAR SUB-BASE AND GRANULAR BASE

- .1 Place granular base and sub-base material on clean unfrozen surface, free from snow and ice.
- .2 Place granular base and sub-base to compacted thicknesses as indicated. Do not place frozen material.
- .3 Place in layers not exceeding 150 mm compacted thickness. Compact to density not less than 98 % maximum dry density in accordance with ASTM D 698.
- .4 Finished base surface to be within 10 mm of specified grade, but not uniformly high or low.

3.3 ASPHALT PRIME

- .1 Cutback asphalt:
 - .1 Heat asphalt prime for pumping and spraying in accordance with CAN/CGSB-16.1.
 - .2 Apply cutback asphalt prime to granular base, at rate directed by Departmental Representative, but do not exceed 2.2 L/m².
 - .3 Apply on dry surface, unless otherwise directed by Departmental Representative.
- .2 Emulsified asphalt:
 - .1 Dilute asphalt emulsion with clean water at 1:1 ratio for application. Mix thoroughly by pumping or other method approved by Departmental Representative.
 - .2 Apply diluted asphalt emulsion at rate directed by Departmental Representative but do not exceed 5 L/m².
 - .3 Apply on damp surface unless otherwise directed by Departmental Representative.
- .3 Do not apply prime when air temperature is less than 5 degrees C or when rain is forecast within 2 hours.
- .4 If asphalt prime fails to set within 24 hours, spread sand blotter material in amounts required to absorb excess material. Sweep and remove excess blotter material.

3.4 ASPHALT TACK COAT

- .1 In accordance with Section 32 12 13.16 – Asphalt Tack Coats.

3.5 PLANT AND MIXING REQUIREMENTS

- .1 In accordance with ASTM D 995.

3.6 ASPHALT CONCRETE PAVING

- .1 Obtain approval from Departmental Representative before placing asphalt mix.
- .2 Place asphalt mix only when base or previous course is dry and air temperature is above 7 C.
- .3 Place asphalt concrete in compacted layers not exceeding 50 mm (one lift).
- .4 Compact each course with roller as soon as it can support roller weight without undue cracking or displacement.
- .5 Compact parking lot and driveway asphalt concrete to required density. Roll until roller marks are eliminated.
- .6 Keep roller speed slow enough to avoid mix displacement and do not stop roller on fresh pavement.
- .7 Moisten roller wheels with water to prevent pick up of material.
- .8 Compact mix with hot tampers or other equipment approved by Departmental Representative, in areas inaccessible to roller.
- .9 Finish surface to be within 10 mm of design elevation and with no irregularities greater than 10 mm in 4.5 m.
- .10 Repair areas showing checking, rippling or segregation as directed by Departmental Representative.

3.7 JOINTS

- .1 Remove surplus material from surface of previously laid strip. Do not deposit on surface of freshly laid strip.
- .2 Paint contact surfaces of existing structures such as manholes, curbs or gutters with bituminous material prior to placing adjacent pavement.
- .3 For cold joints, cut back to full depth vertical face and tack face with hot asphalt.
- .4 For longitudinal joints, overlap previously laid strip with spreader by 25 to 50 mm.

3.8 TESTING

- .1 Inspection and testing of asphalt pavement will be carried out by designated testing laboratory in accordance with Section 01 45 00 - Quality Control.
- .2 Costs of tests will be paid under cash allowance.

3.9 PROTECTION

- .1 Keep vehicular traffic off newly paved areas until paving surface temperature has cooled below 38 °C. Do not permit stationary loads on pavement until 24 hours after placement.
- .2 Provide access to buildings as required. Arrange paving schedule so as not to interfere with normal use of premises.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 30 00 – Cast-in-Place Concrete.
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .3 Section 32 11 16.01 – Granular Sub-Base.
- .4 Section 32 11 23 – Aggregate Base Courses.
- .5 Section 31 05 16 – Aggregate Materials.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C117-04, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .3 ASTM D260-86(2001), Standard Specification for Boiled Linseed Oil.
 - .4 ASTM D698-00ae1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600 kN-m/m³).
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-3.3-99 (March 2004), Kerosene, Amend. No. 1, National Standard of Canada.
 - .2 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.3 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: submit WHMIS MSDS sheets.
- .3 Inform Departmental Representative of proposed source of materials and provide access for sampling at least 4 weeks prior to commencing work.
- .4 If materials have been tested by accredited testing laboratory approved by Departmental Representative within previous 2 months and have passed tests equal to requirements of

this specification, submit test certificates from testing laboratory showing suitability of materials for this project.

Part 2 Products

2.1 MATERIALS

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Joint filler: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Granular base: material to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Type 1, 2 or 3 fill.
 - .2 Crushed stone or gravel.
 - .3 Gradations: within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.
- .4 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water-soluble soap.
- .5 Fill material: to Section 31 05 16 - Aggregate Materials and following requirements:
 - .1 Type 1, 2 or 3 fill.
 - .2 Crushed stone or gravel.
 - .3 Gradations: within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.1.

Part 3 Execution

3.1 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials.
 - .1 Dispose of surplus and unsuitable excavated material off site.

3.2 GRANULAR BASE

- .1 Obtain Departmental Representative's approval of subgrade before placing granular base.
- .2 Place granular base material to lines, widths, and depths as indicated.

- .3 Compact granular base in maximum 150 mm layers to at least 95% of maximum density to ASTM D698.

3.3 CONCRETE

- .1 Obtain Departmental Representative's approval of granular base and reinforcing steel prior to placing concrete.
- .2 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.
- .4 Provide edging as indicated with 10 mm radius edging tool.
- .5 Slip-form pavers equipped with string line system for line and grade control may be used if quality of work acceptable to Departmental Representative can be demonstrated. Hand finish surfaces when directed by Departmental Representative.

3.4 TOLERANCES

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

3.5 EXPANSION AND CONTRACTION JOINTS

- .1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals of 2 m.
- .2 Install expansion joints at intervals of 6 m.
- .3 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.

3.6 ISOLATION JOINTS

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Seal isolation joints with sealant approved by Departmental Representative.

3.7 CURING

- .1 Cure concrete by adding moisture continuously in accordance with CSA-A23.1/A23.2 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound as directed by Departmental Representative.

- .2 Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
- .3 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

3.8 BACKFILL

- .1 Allow concrete to cure for 4 days prior to backfilling.
- .2 Backfill to designated elevations with material as directed by Departmental Representative.
 - .1 Compact and shape to required contours as indicated.

3.9 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian General Standards Board (OGSB)
 - .1 CAN/CGSB-1.5-M91, Low Flash Petroleum Spirits Thinner.
 - .2 CGSB1-GP-74M-79, Paint, Traffic, Alkyd.
- .2 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .3 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual - current edition.
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.

1.2 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature and data sheets for pavement markings and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Samples:
 - .1 Submit to Departmental Representative following material sample quantities at least 4 weeks prior to commencing work.
 - .1 Two 1 L samples of each type of paint.

1.3 MEASUREMENT FOR PAYMENT

- .1 Included in Balance of Project.

1.4 DELIVERY, STORAGE AND HANDLING

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

- .2 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Paint:
 - .1 To MPI – EXT 2.1B, Alkyd zone/traffic marking.
 - .2 Paints: in accordance with MPI recommendation for surface conditions.
 - .1 Paints: maximum VOC limit 100 g/L to SCAQMD Rule 1113 to GS-11.
 - .3 Colour: to MPI listed, yellow and white.
 - .4 Upon request, Departmental Representative will supply qualified product list of paints applicable to work. Qualified paints may be used but Departmental Representative reserves right to perform further tests.
- .2 Thinner: to MPI listed manufacturer.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings previously installed under other Sections or Contracts are acceptable for product installation in accordance with MPI instructions prior to pavement markings installation.
 - .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .3 Proceed with Work only after unacceptable conditions have been rectified.

3.2 EQUIPMENT REQUIREMENTS

- .1 Paint applicator: approved pressure type with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.

3.3 APPLICATION

- .1 Pavement markings to be laid out by Contractor and verified by Departmental Representative.

- .2 Unless otherwise approved by Departmental Representative, apply paint only when air temperature is above 10 °C, wind speed is less than 60 km/h and no rain is forecast within next 4h.
- .3 Apply traffic paint evenly at rate of 3m²/L.
- .4 Do not thin paint unless approved by Departmental Representative.
- .5 Symbols and letters to conform to dimensions indicated on existing conditions.
- .6 Paint lines to be of uniform colour and density with sharp edges.
- .7 Thoroughly clean distributor tank before refilling with paint of different colour.

3.4 TOLERANCE

- .1 Paint markings to be within plus or minus 12mm of dimensions indicated on existing conditions.
- .2 Remove incorrect markings as directed by Departmental Representative.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

3.6 PROTECTION OF COMPLETED WORK

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 32 92 23 – Sodding.

1.2 MEASUREMENT PROCEDURES

- .1 Included in Balance of Project.

1.3 PAYMENT PROCEDURES

- .1 Testing of topsoil: Departmental Representative will pay for cost of tests as specified in Section 01 29 83 - Payment Procedures for Testing Laboratory Services.

1.4 REFERENCES

- .1 Agriculture and Agri-Food Canada
 - .1 The Canadian System of Soil Classification, Third Edition, 1998.
- .2 Canadian Council of Ministers of the Environment
 - .1 PN1340-2005, Guidelines for Compost Quality.

1.5 DEFINITIONS

- .1 Compost:
 - .1 Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil conditioner.
 - .2 Compost is processed organic matter containing 40% or more organic matter as determined by Walkley-Black or Loss On Ignition (LOI) test.
 - .3 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below (25) (50)), and contain no toxic or growth inhibiting contaminants.
 - .4 Composed bio-solids to: CCME Guidelines for Compost Quality, Category (A) (B).

1.6 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Quality control submittals:
 - .1 Soil testing: submit certified test reports showing compliance with specified performance characteristics and physical properties as described in PART 2.2 - SOURCE QUALITY CONTROL.

- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.7 QUALITY ASSURANCE

- .1 Pre-installation meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

Part 2 Products

2.1 TOPSOIL

- .1 Topsoil for seeded areas: mixture of particulates, microorganisms and organic matter which provides suitable medium for supporting intended plant growth.
 - .1 Soil texture based on The Canadian System of Soil Classification, to consist of 20 to 70% sand, minimum 7% clay, and contain 2 to 10% organic matter by weight.
 - .2 Contain no toxic elements or growth inhibiting materials.
 - .3 Finished surface free from:
 - .1 Debris and stones over 50 mm diameter.
 - .2 Course vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.
 - .4 Consistence: friable when moist.

2.2 SOURCE QUALITY CONTROL

- .1 Advise Departmental Representative of sources of topsoil to be utilized with sufficient lead time for testing.
- .2 Contractor is responsible for amendments to supply topsoil as specified.
- .3 Soil testing by recognized testing facility for PH, P and K, and organic matter.
- .4 Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative.
 - .1 Soil sampling, testing and analysis to be in accordance with Provincial standards.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to sediment and erosion control plan, specific to site, that complies with requirements of authorities having jurisdiction.

- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 STRIPPING OF TOPSOIL

- .1 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush, weeds and grasses and removed from site.
- .2 Strip topsoil to depths as directed by Departmental Representative.
 - .1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.
- .3 Stockpile in locations as directed by Departmental Representative.
 - .1 Stockpile height not to exceed 2 m.
- .4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill as directed by Departmental Representative.
- .5 Protect stockpiles from contamination and compaction.

3.3 PREPARATION OF EXISTING GRADE

- .1 Verify that grades are correct.
 - .1 If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.
 - .1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.
 - .2 Remove debris which protrudes more than 75 mm above surface.
 - .3 Dispose of removed material off site.
- .4 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.
 - .1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.4 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

- .1 Place topsoil after Departmental Representative has accepted subgrade.
- .2 Spread topsoil in uniform layers not exceeding 150 mm.

- .3 For sodded areas keep topsoil 15 mm below finished grade.
- .4 Spread topsoil to following minimum depths after settlement.
 - .1 150 mm for seeded areas.
 - .2 135 mm for sodded areas.
- .5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.5 FINISH GRADING

- .1 Grade to eliminate rough spots and low areas and ensure positive drainage.
 - .1 Prepare loose friable bed by means of cultivation and subsequent raking.
- .2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.
 - .1 Leave surfaces smooth, uniform and firm against deep foot printing.

3.6 ACCEPTANCE

- .1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.7 SURPLUS MATERIAL

- .1 Dispose of materials except topsoil not required off site.

3.8 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- .3 Section 32 91 19.13 - Topsoil Placement and Grading.

1.2 MEASUREMENT PROCEDURES

- .1 Payment for sodding will be made at unit price bid of actual area surface measurements taken and computed by Departmental Representative for:
 - .1 Turf Grass Nursery Sod Type per square metre.
 - .2 Commercial Grade Turf Grass Nursery Sod per square metre.
- .2 There will be no measurement for payment of maintenance during the establishment period or warranty period.

1.3 SUBMITTALS

- .1 Samples.
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Obtain approval of samples by Departmental Representative.

1.4 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements.

1.5 SCHEDULING

- .1 Schedule sod laying to coincide with preparation of soil surface.
- .2 Schedule sod installation when frost is not present in ground.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management And Disposal.

- .2 Divert unused fertilizer from landfill to official hazardous material collections site.
- .3 Do not dispose of unused fertilizer into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 MATERIALS

- .1 Number One Turf Grass Nursery Sod: sod that has been especially sown and cultivated in nursery fields as turf grass crop.
 - .1 Turf Grass Nursery Sod types:
 - .1 Number One Kentucky Bluegrass Sod: Nursery Sod grown solely from seed of cultivars of Kentucky Bluegrass, containing not less than 50% Kentucky Bluegrass cultivars.
 - .2 Number One Kentucky Bluegrass Sod - Fescue Sod: Nursery Sod grown solely from seed mixture of cultivars of Kentucky Bluegrass and Chewing Fescue or Creeping Red Fescue, containing not less than 40% Kentucky Bluegrass cultivars and 30% Chewing Fescue or Creeping Red Fescue cultivars.
 - .3 Number One Named Cultivars: Nursery Sod grown from certified seed.
 - .2 Turf Grass Nursery Sod quality:
 - .1 Not more than 2 broadleaf weeds or 10 other weeds per 40 square metres.
 - .2 Density of sod sufficient so that no soil is visible from height of 1500 mm when mown to height of 50 mm.
 - .3 Mowing height limit: 35 to 65 mm.
 - .4 Soil portion of sod: 6 to 15 mm in thickness.
- .2 Commercial Grade Turf Grass Nursery: sod that has not been grown as Turf Grass Nursery Sod crop.
 - .1 Mow sod at height directed by Departmental Representative within 36 hours prior to lifting, and remove clippings.
- .3 Sod establishment support:
 - .1 Geotextile fabric: biodegradable, 25 mm square mesh.
 - .2 Wooden pegs: 17 x 8 x 200 mm.
 - .3 Biodegradable starch pegs: 17 x 8 x 200 mm.
- .4 Water:
 - .1 Free of impurities that would inhibit growth.
- .5 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".

- .2 Complete, synthetic, slow release with 65 % of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain approval from Departmental Representative of sod at source.
- .2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

Part 3 Execution

3.1 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 19.13 - Topsoil Placement and Grading. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, and elevations indicated, to tolerance of plus or minus 8 mm, for Turf Grass Nursery Sod and plus or minus 15 mm for Commercial Grade Turf Grass Nursery, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.2 SOD PLACEMENT

- .1 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.
- .2 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .3 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 SOD PLACEMENT ON SLOPES AND PEGGING

- .1 Install and secure geotextile fabric in areas indicated, in accordance with manufacturer's instructions.
- .2 Start laying sod at bottom of slopes.
- .3 Peg sod on slopes steeper than 3 horizontal to 1 vertical, within 1 m of catch basins and within 1 m of drainage channels and ditches to following pattern:

- .1 100 mm below top edge at 200 mm on centre for first sod sections along contours of slopes.
- .2 Not less than 3-6 pegs per square metre.
- .3 Not less than 6-9 pegs per square metre in drainage structures. Adjust pattern as directed by Departmental Representative.
- .4 Drive pegs to 20 mm above soil surface of sod sections.

3.4 FERTILIZING PROGRAM

- .1 Fertilizer shall be applied prior to application of sod.

3.5 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance.
- .2 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.
- .3 Cut grass to 50 mm when or prior to it reaching height of 75 mm. Remove clippings which will smother grassed areas as directed by Departmental Representative.
- .4 Maintain sodded areas weed free 95%.
- .5 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.

3.6 ACCEPTANCE

- .1 Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
 - .1 Sodded areas are properly established.
 - .2 Sod is free of bare and dead spots.
 - .3 No surface soil is visible from height of 1500 mm when grass has been cut to height of 50 mm.
 - .4 Sodded areas have been cut minimum 2 times prior to acceptance.
- .2 Sodded Commercial Grade Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:
 - .1 Sodded areas are properly established.
 - .2 Extent of surface soil visible when grass has been cut to height of 60 mm is acceptable.
 - .3 Sod is free of bare or dead spots and extent of weeds apparent in grass is acceptable.
 - .4 Sodded areas have been cut minimum 2 times prior to acceptance.
 - .5 Fertilizing in accordance with fertilizer program has been carried out at least once.

- .3 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.7 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period:
 - .1 Water sodded Turf Grass Nursery Sod and Commercial Grade Turf Grass Nursery Sod areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.
 - .2 Repair and re-sod dead or bare spots to satisfaction of Departmental Representative.
 - .3 Cut grass and remove clippings that will smother grass as directed by Departmental Representative to height as follows:
 - .1 Turf Grass Nursery Sod:
 - .1 50 mm during normal growing conditions.
 - .2 Commercial Grade Turf Grass Nursery Sod:
 - .1 60 mm during normal growing conditions.
 - .3 Cut grass at 2 week intervals or as directed by Departmental Representative, but at intervals so that approximately one third of growth is removed in single cut.
 - .4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles.
 - .5 Eliminate weeds by mechanical means to extent acceptable to Departmental Representative.

3.8 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

- .1 General

1.2 RELATED SECTIONS

- .1 Section 31 05 16 - Aggregate Materials.
- .2 Section 31 23 33.01 – Excavating, Trenching and Backfilling.
- .3 Section 32 11 23 – Aggregate Base Courses.

1.3 MEASUREMENT PROCEDURES

- .1 Included in Balance of Project.

1.4 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM A48/A48M-03, Standard Specification for Gray Iron Castings.
 - .2 ASTM C478-08, Specification for Precast Reinforced Concrete Manhole Sections.
 - .3 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 Ontario Provincial Standard Drawings (OPSD)
 - .1 OPSD 400.010 (November 2013 Rev. 2) – Cast Iron, Square Frame With Square Overflow Type Dished Grate For Catch Basins, Herring Bone Openings.
 - .2 OPSD 401.010 (November 2013 Rev. 3) – Cast Iron, Square Frame With Circular Closed Or Open Cover For Maintenance Holes.
 - .3 OPSD 701.010 (November 2014, Rev. 5) – Precast Concrete Maintenance Hole, 1200 mm Diameter.
 - .4 OPSD 704.010 (November 2014, Rev. 3) – Precast Concrete Adjustment Units For Maintenance Holes, Catch Basins, And Valve Chambers.
 - .5 OPSD 704.011 (November 2008, Rev. 1) – High Density Polyethylene Adjustment Units For Maintenance Holes, Catch Basins, And Valve Chambers.
 - .6 OPSD 705.010 (November 2014, Rev. 3) – Precast Concrete Catch Basin 600 x 600 mm.
 - .7 OPSD 708.020 (November 2011, Rev. 3) – Support For Pipe At Catch Basin or Maintenance Hole.
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 407 (November 2015) - Construction Specification For Maintenance Hole, Catch Basin, Ditch Inlet And Valve Chamber Installation.
 - .2 OPSS 1351 (November 2014) – Material Specification For Precast Reinforced Concrete Components For Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers.

- .3 OPSS 1853 (November 2007) – Material Specification For Rubber Adjustment Units For Maintenance Holes, Catch Basins, and Valve Chambers.
- .4 OPSS 1854 (November 2014) – Material Specification For High Density Polyethylene (HDPE) And Expanded Polystyrene (EPS) Adjustment Units For Maintenance Holes, Catch Basins, And Valve Chambers.

1.5 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies WHMIS MSDS sheets.
- .3 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control:
 - .1 Submit manufacturer's test data and certification at least 4 weeks prior to beginning Work. Include manufacturer's drawings, information and shop drawings where pertinent.
 - .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

1.6 QUALITY ASSURANCE

- .1 Pre-Installation Meetings: convene pre-installation meeting one (1) week prior to beginning on-site installation, with contractor's representative and Departmental Representative to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building sub trades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

Part 2 Products

2.1 MATERIALS

- .1 Precast catch basins units to ASTM C478 and OPSD 705.010, complete with 600 mm deep sump. Precast catch basin maintenance hole units to ASTM C478 and OPSD 701.010.
 - .1 Adjusting rings: to ASTM C478 and OPSD 704.010 or 704.011.
 - .2 Frames, gratings, covers to dimensions as indicated and following requirements:
 - .1 Metal gratings and covers to bear evenly on frames. A frame with grating or cover to constitute one unit. Assemble and mark unit components before shipment.
 - .2 Gray iron castings: to ASTM A48/A48M, strength class 30B.
 - .3 Castings coated with two applications of asphalt varnish.
 - .4 Catch basin frames and covers to OPSD 400.010.
 - .5 Catch basin maintenance hole frames and covers to OPSD 401.010 Type 'B'.
 - .3 Components: to ASTM C478M and OPSS 1351.
- .2 Granular bedding: Granular base material in accordance with Section 32 11 23 – Aggregate Base Courses.

Part 3 Execution

3.1 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.
- .2 Obtain approval of Departmental Representative before installing, catch basins or catch basin maintenance holes.

3.2 INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade, in accordance with OPSS 407. Maximum relative difference between specified invert elevations not to exceed 10 mm.
- .2 Complete units as pipe laying progresses.
 - .1 Maximum of three units behind point of pipe laying will be allowed.
- .3 Set precast concrete base on 150 mm minimum of granular bedding compacted to 100% maximum density to ASTM D698.
- .4 Precast units:

- .1 Plug lifting holes with precast concrete plugs set in cement mortar or mastic compound.
- .2 Compact granular backfill to 95% maximum density to ASTM D698.
- .3 Place frame and cover on top section to elevation as indicated. If adjustment required use ring.
- .4 Clean units of debris and foreign materials. Remove fins and sharp projections. Prevent debris from entering system.
- .5 Refer to OPSD 708.020.

END OF SECTION

Part 1 General**1.1 GENERAL**

- .1 The contractor shall provide all materials, equipment and labor necessary to install, test and place into service the pre-engineered fiberglass pump station as shown in the plans and described in this specification. The pre-engineered pump station package, including submersible pumps, pump control, fiberglass pump station, internal piping, accessories and auxiliary equipment shall be supplied by the pump manufacturer.

1.2 REQUIREMENTS

- .1 The pre-engineered fiberglass pump station package shall be capable of handling unscreened sewage, wastewater or stormwater in accordance with the design conditions defined in this specification and drawing package.
- .2 The fiberglass pump station shall have an integral, hopper-shaped pump station bottom, which is self-cleaning by virtue of its design. The flat surface area shall be minimized to an area that is directly influenced by the pump suction and shall be free of obstacles. The bottom surface area shall have a ratio of 1:4 as it relates to the cross-sectional area of the pump station. The sloping walls of the pump station bottom shall further optimize the self-cleaning features of this station by directing all solids, trash and sludge, normally found in sewage and wastewater, to the suction of the submersible pumps to facilitate removal and effectively clean the bottom.
- .3 Furnish and install 2 submersible non-clog wastewater pump(s). Each pump shall be equipped with submersible electric motor, connected for operation on a 600 volt, 3 phase, 60 hertz, three-wire service, with 16 meters of submersible cable (SUBCAB), suitable for submersible pump applications. The power cable shall be sized according to CEC and CSA standards. The pump shall be supplied with a mating cast iron 50mm discharge connection and be capable of delivering 2.5l/s at 9.0m TDH. Shut off head shall be 0.6m (minimum). Each pump shall be fitted with necessary lifting chain or stainless steel cable. The working load of the lifting system shall be 50% greater than the pump unit weight.

Part 2 Products**2.1 PUMPS**

- .1 Pump Design
 - .1 The pump(s) shall be automatically and firmly connected to the discharge connection, guided by no less than two (stainless steel, galvanizes steel) guide pipes extending from the top of the station to the discharge connection. There shall be no need for personnel to enter the wet-well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. No portion of the pump shall bear directly on the sump floor.

.2 Pump Construction

- .1 Major pump components shall be of grey cast iron, ASTM A-48, Class 35B, with smooth surfaces devoid of blow holes or other irregularities. All exposed nuts or bolts shall be AISI type 304 stainless steel construction. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.
- .2 Sealing design shall incorporate metal-to-metal contact between machined surfaces. Critical mating surfaces where watertight sealing is required shall be machined and fitted with Nitrile or Viton rubber O-rings. Fittings will be the result of controlled compression of rubber O-rings in two planes and O-ring contact of four sides without the requirement of a specific torque limit.
- .3 Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered as adequate or equal. No secondary sealing compounds, elliptical O-rings, grease or other devices shall be used.

.3 Cable Entry Seal

- .1 The cable entry seal design shall preclude specific torque requirements to insure a watertight and submersible seal. The cable entry shall consist of a single cylindrical elastomer grommet, flanked by stainless steel washers, all having a close tolerance fit against the cable outside diameter and the entry inside diameter and compressed by the body containing a strain relief function, separate from the function of sealing the cable. The assembly shall provide ease of changing the cable when necessary using the same entry seal. **The cable entry junction chamber and motor shall be separated by a stator lead sealing gland or terminal board, which shall isolate the interior from foreign material gaining access through the pump top. Epoxies, silicones, or other secondary sealing systems shall not be considered acceptable.**

.4 Motor

- .1 The pump motor shall be a NEMA B design, induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber. The stator windings shall be insulated with moisture resistant Class H insulation rated for 180°C (356°F). The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The motor shall be inverter duty rated in accordance with NEMA MG1, Part 31. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable. The motor shall be designed for continuous duty handling pumped media of 40°C (104°F) and capable of at least 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum. Thermal switches set to open at 125°C (260°F) shall be embedded in the stator end coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel. The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer compression seal. Connection between the cable conductors and stator leads shall be made with

- threaded compression type binding posts permanently affixed to a terminal board. The motor and the pump shall be produced by the same manufacturer.
- .2 The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation up to 40°C (104°F) ambient and with a temperature rise not to exceed 80°C. A performance chart shall be provided upon request showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.
 - .3 The power cable shall be sized according to the CEC and CSA standards and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chlorinated polyethylene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet or greater.
 - .4 The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.
- .5 Motor Cooling System
- .1 (Pumps with motors up to 10-hp) Motors are sufficiently convection-cooled by the surrounding environment or pumped media.
 - .2 (Pumps with motors of 12-hp and greater) Motors shall be equipped with an integral motor cooling jacket of either an open type or closed-loop type.
- .6 Bearings
- .1 The pump shaft shall rotate on two bearings. Motor bearings shall be permanently grease lubricated. The upper bearing shall be a single deep groove ball bearing. The lower bearing shall be a two row angular contact bearing to compensate for axial thrust and radial forces. **Single row lower bearings are not acceptable.**
- .7 Mechanical Seal
- .1 Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies. The seals shall operate in a lubricant reservoir that hydrodynamically lubricates the lapped seal faces at a constant rate. The lower, primary seal unit, located between the pump and the lubricant chamber, shall contain one stationary and one positively driven rotating corrosion resistant, **tungsten-carbide** ring. The upper, secondary seal unit, located between the lubricant chamber and the motor housing, shall contain one stationary and one positively driven rotating corrosion resistant, **tungsten-carbide** seal ring. Each seal interface shall be held in contact by its own spring system. The seals shall require neither maintenance nor adjustment nor **depend on direction of rotation for sealing**. The position of both mechanical seals shall depend on the shaft. Mounting of the lower mechanical seal on the impeller hub will not be acceptable. For unique applications, other seal face materials shall be available.
 - .2 **The following seal types shall not be considered acceptable nor equal to the dual independent seal specified:** shaft seals without positively driven rotating members, or conventional double mechanical seals containing either a common

- single or double spring acting between the upper and lower seal faces. No system requiring a pressure differential to offset pressure and to effect sealing shall be used.
- .3 Each pump shall be provided with a lubricant chamber for the shaft sealing system. The lubricant chamber shall be designed to prevent overfilling and to provide lubricant expansion capacity. The drain and inspection plug, with positive anti-leak seal shall be easily accessible from the outside. The seal system shall not rely upon the pumped media for lubrication. **The motor shall be able to operate non-submerged without damage while pumping under load.**
 - .8 Seal lubricant shall be non-toxic and FDA Approved.
 - .9 Pump Shaft
 - .1 Pump and motor shaft shall be the same unit. The pump shaft is an extension of the motor shaft. Couplings shall not be acceptable. The shaft shall be stainless steel – ASTM A479 S43100-T.
 - .2 The use of stainless steel sleeves will not be considered equal to stainless steel shafts as shaft sleeves only protect the shaft around the lower mechanical seal.
 - .10 Pump Impeller / Volute for C – type Pumps
 - .1 The impeller(s) shall be of gray cast iron, Class 35B, dynamically balanced, double shrouded non-clogging design having a long throughlet without acute turns. The impeller(s) shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in wastewater. Whenever possible, a full vaned, not vortex, impeller shall be used for maximum hydraulic efficiency; thus, reducing operating costs. Impeller(s) shall be keyed to the shaft, retained with an Allen head bolt and shall be capable of passing a minimum 19 mm diameter solid. All impellers shall be coated with an acrylic dispersion zinc phosphate primer.
 - .2 A wear ring system shall be used to provide efficient sealing between the volute and suction inlet of the impeller. Each pump shall be equipped with a brass, or nitrile rubber coated steel ring insert that is drive fitted to the volute inlet.
 - .3 Pump volute(s) shall be single-piece grey cast iron, Class 35B, non-concentric design with smooth passages large enough to pass any solids that may enter the impeller. Minimum inlet and discharge size shall be as specified.
 - .11 Pump Impeller / Volute for N – type Pumps
 - .1 The impeller(s) shall be of (gray cast iron, Class 35B / high chrome iron), dynamically balanced, semi-open, multi-vane, back-swept, non-clog design. The impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on the volute suction which shall keep them clear of debris, maintaining an unobstructed leading edge. The impeller(s) vanes shall have screw-shaped leading edges. The leading edges of the cast iron impellers shall be hardened to Rc 45. The impeller shall be capable of handling solids, fibrous materials, heavy sludge and other matter found in waste water. The screw shape of the impeller inlet shall provide an inducing effect for the handling of sludge and rag-laden wastewater. Impellers shall be locked to the shaft, held by an impeller bolt and treated with a corrosion inhibitor.

- .2 The pump volute shall be of A48 Class 35B gray cast iron and shall have a (cast iron / high chrome iron) replaceable ring having spiral shaped cast groove(s) at the suction of the volute. The internal insert ring shall provide effective sealing between the pump volute and the multi-vane, semi-open impeller. The sharp spiral groove(s) shall provide the shearing edge(s) across which each impeller vane leading edge shall cross during its rotation in order to remain unobstructed. The clearance between the internal volute bottom and the impeller leading edges shall be adjustable.
- .12 Sump Mixing Valve
- .1 One pump unit in each pump station shall be equipped with an automatically operating Flygt Mix-flush Valve mounted directly to a machined boss located on the exterior of the pump volute casting that will provide mixing action within the sump at the start of the pumping cycle. The valve shall redirect a portion of the pumped media into the sump to re-suspend solids and grease by the turbulent action of its discharge.
 - .2 The valve shall be equipped with an adjustable, wear-resistant discharge nozzle that can be used to direct flow within the sump. The valve shall operate by differential pressure across the valve and shall not require any electric or pneumatic power source to operate. The valve shall be suitable for use in Class I, Division 1 hazardous locations.
 - .3 The valve shall open at the beginning of each pumping cycle and shall automatically close during the pump operation after a pre-set time. A method of adjusting the valve operating time shall be provided.
- .13 Motor Protection
- .1 All stators shall incorporate thermal switches in series to monitor the temperature of each phase winding. The thermal switches shall open at 125°C (260°F), stop the motor and activate an alarm.
 - .2 A leakage sensor shall be available as an option to detect water in the stator chamber. The Float Leakage Sensor (FLS) is a small float switch used to detect the presence of water in the stator chamber. When activated, the FLS will stop the motor and send an alarm both local and/or remote. **USE OF VOLTAGE SENSITIVE SOLID STATE SENSORS AND TRIP TEMPERATURE ABOVE 125°C (260°F) SHALL NOT BE ALLOWED.**
 - .3 The thermal switches and FLS shall be connected to a Mini CAS (Control and Status) monitoring unit. The Mini CAS monitoring unit shall be designed to be mounted in any control panel.

2.2 PRE-ENGINEERED FIBERGLASS PUMP STATION CONSTRUCTION

- .1 The station cylinder shall be wound to the station bottom such that the assembly is of a monolithic design, which is capable of withstanding the full hydrostatic head from the exterior of the station while the station is completely empty.
- .2 The cylinder shall be made of FRP using the filament winding process. A safety factor of two (2) on the minimum ultimate tensile strength of the laminate bottom shall be used in designing the basin and cylinder wall thicknesses for the station, taking into account all normally imposed loads arising from floatation, soil pressures, normal backfill, handling

loads, operating loads and static loads imposed by equipment used in hoisting the pumps in and out of the station.

- .3 The cylinder is a filament wound laminate constructed by saturating continuous strand glass roving in a controlled pattern over a corrosion resistant white-pigmented resin layer that is to be 8 mils minimum thickness. The roving's shall be applied uniformly throughout the entire length of the cylinder as required to provide adequate thickness for the mechanical loads of each application. The winding pattern shall be a combination of helical and hoop wraps and shall produce a dense laminate without non-reinforced resin pockets or air bridging between the rovings. The glass content of the structural laminate shall be 60% to 70% by weight.
- .4 The station bottom is a 30% to 50% glass content, chop spray laminate, constructed by built-up layers of chop spray and chopped strand mat applied along with a catalyzed resin. Each layer shall be properly wetted out and rolled out so that it is free of air voids until the required wall thickness has been obtained.
- .5 All inside surfaces shall be smooth and free of cracks and crazing. The inside surface will be pigmented or gel coated to a bright white finish. All surfaces other than those made in contact with the mold surface shall be coated with air-inhibited resin or gelcoat, this includes any cut edges of laminate.
- .6 The station shall be provided with one (1) anti-flotation flange located near the bottom of the station. This anti-flotation flange is an integral part of the station and is sufficient in design to withstand the forces acting upon the station due to the subsoil water pressure. Once the station is inserted into the hole, concrete ballast may be required depending on the station depth, please refer to the recommendations for concrete ballast as recommended.
- .7 The combination of the flange and the loading of backfill material over the concrete shall provide adequate ballast against buoyancy under full hydrostatic head conditions.

2.3

STATION COVER

- .1 The station cover shall be of 1/4-inch thick Type-5086 aluminum diamond plate with an integral Safe-Hatch access cover. All bars, angles and shapes shall be type 6061-T6 aluminum. The access cover frame shall be a minimum of 4-inches deep and shall be adequately sized to allow for easy passage of the submersible pumps. The Safe-Hatch access cover shall be designed to support the weight of the pump unit plus pedestrian traffic. The access door(s) shall be equipped with a hold-open arm, held open in the 90-degree position. Cover door hinges shall be heavy-duty design and be cast 1/4-inch thick Type 316 stainless steel with 3/8-inch diameter stainless steel hinge pins. All fasteners shall be type-316 stainless steel. Each hatch shall be supplied with a type-316 stainless steel slam lock, having a key-way protected by a threaded plug. The plug shall be flush with the diamond plate cover. The hatch shall be equipped with an aluminum lift handle that shall be flush to the top of the diamond plate cover.
- .2 The access cover unit shall be equipped with a Safe-Hatch hinged safety grate to provide protection against fall-through and to control access into the confined space. Grate openings shall be sized to allow for routine maintenance inspection without having to open the safety grate. The closed safety grate shall be designed to support the weight of one pump to facilitate site pump wash-down and inspection. The hatch opening will have a 4" elevated toe board to prevent tools from being kicked into the wet well (per OSHA 1926.502 (j)).

2.4 ELECTRIC CONTROLS

.1 Enclosure and Level Control

- .1 The pre-engineered fiberglass pump station shall be furnished with pre-installed conduit fittings for connection of the pump power/control and level control wiring. Pump station liquid level control shall be as per options listed below. A stainless steel mounting bracket and a 2" electrical conduit fitting shall be included. All electrical and control accessories shall be shipped inside of the pump station for field installation.

.2 Pump Control Panel

- .1 The package pump station shall be furnished with an automatic pump control system housed in a NEMA Type-3 Steel enclosure. The control system shall include the following features:
 - .1 NEMA 3 rated steel enclosure with aluminum inner door and padlock hasp
 - .2 IEC rated motor starters
 - .3 Hand / Off / Auto selector switch for each pump
 - .4 Main incoming power circuit breaker
 - .5 Individual pump circuit breakers
 - .6 Duplex pump station microprocessor based pump controller.
 - .7 Float switches for level sensing (3)
 - .8 Thermal & seal protection
 - .9 2Kva control power transformer
 - .10 Phase monitor
 - .11 Alarm light (red dome light style)
 - .12 Solid state reduced voltage starting
 - .13 Horn or bell audible alarm with silence pushbutton
 - .14 Run time meters, one per pump
 - .15 Intrinsic safety
 - .16 12" X 10" space reserved for telemetry
- .2 Suppliers such as John Brooks Company Limited, may assist in providing design and shop drawings for pump station.

Part 3 Execution

3.1 EXCAVATION AND BACKFILL

- .1 Excavate and backfill in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling and as indicated.
- .2 Obtain approval of Departmental Representative before installing pre-manufactured pump station.

3.2 INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade, in accordance with OPSS 407. Maximum relative difference between specified invert elevations not to exceed 10 mm.
- .2 Install station as per Manufacturers recommendation.

3.3 TESTING

- .1 Standard Pump Factory Test
 - .1 Each completed and assembled pump/motor unit shall undergo the following factory tests at the manufacturer's plant prior to shipment:
 - .1 Minimum 3-point hydraulic performance test
 - .2 No-Leak seal integrity test
 - .3 Electrical integrity test
 - .2 Optional Pump Factory Test
 - .1 Each completed and assembled pump/motor unit shall be performance tested at the manufacturer's plant prior to shipment. The results of the hydraulic performance test shall be within the limits set forth by the Hydraulic Institute. Certified curves shall be submitted to the owner or his design engineer for approval prior to shipment.
 - .2 As a minimum, each finished pump shall be performance tested for total dynamic head, capacity, efficiency and power requirements at six (6) operating points plus shut-off head for the selected impeller diameter, of which, the design capacity operating point shall be included.
- .3 Field Start-up
 - .1 After installation, a pump station start-up shall be performed by the installing contractor under the supervision of the manufacture's authorized representative. One (1) day of field service shall be provided by an authorized, factory trained representative of the pump manufacturer. Services shall include, but not be limited to, inspection of the completed pump station installation to ensure that it has been performed in accordance with the manufacturer's instructions and recommendations, supervision of all field-testing and activation of the Pump Manufacturer's Warranty. The test shall demonstrate to the satisfaction of the Owner that the equipment meets all specified performance criteria, is properly installed and anchored, and operates smoothly without exceeding the full load amperage rating of the motor. The Contractor shall be responsible for coordinating the required field services with the Pump Manufacturer.

3.4 WARRANTY

- .1 Station Warranty
 - .1 The Pump Manufacturer shall Warrant to the Owner the pre-engineered fiberglass pump station components against defects in material and workmanship for a period of one (1) year from date of start-up or 18 months from date of shipment, whichever is sooner. This warranty shall cover the cost of labor and

materials, excluding removal and reinstallation costs, required to correct any warrantable defect, FOB, Manufacturer's authorized warranty service location.

.2 Pump & Control Warranty

.1 Manufacturer's standard warranty covers the pump and control system.

END OF SECTION

Part 1 General**1.1 GENERAL**

- .1 The contractor shall provide all materials, equipment and labor necessary to install, test and place into service the Containerized Suspended Solids Removal System as shown in the plans and described in this specification. The Containerized Suspended Solids Removal System, including all accessories and auxiliary equipment shall be supplied by the manufacturer.
- .2 Suppliers such as Filterboxx, may assist in providing design and shop drawings sewage treatment unit.

1.2 REQUIREMENTS

- .1 The goal of this process is to ensure optimal removal of elemental mercury, TSS, and biological solids. The system is to be designed with four stages of solids separation. The treatment train is to be a 45m³/day suspended solids and biological solids treatment process consists of Primary Settling, Aeration, Clarification, and a Micro-strainer. A more detailed description of the process is described below.
- .2 Influent wastewater is pumped from the pump station, see Section 33 05 15, directly into the plant, where it immediately enters the Primary Settling tank. The Primary Settling tank removes coarse solids from the system and helps to protect downstream mechanical equipment while helping to prevent the accumulation of floatable and inorganic materials in the Aeration Tank. The solids settled in the Primary Settling Tank are removed regularly using a vacuum truck.
- .3 Supernatant from the Primary Settling Tank flows by gravity into the Aeration Tank. A chemical addition system is too be included in the event that it is later established that coagulant or polymer is necessary to help facilitate greater suspended solids separation. Chemical will be added directly into the Aeration tank using a chemical dosing pump.
- .4 Wastewater shall flow by gravity from the Aeration Tank to the Clarifier, to provide a secondary clarification/settling step in the treatment process.
- .5 Clear supernatant water from the Clarifier flows by gravity to a rotary drum Micro-strainer for final effluent polishing to remove any last residual suspended solids prior to discharge. The rotary drum Micro-strainer shall utilize a 28 µm mesh screen to strain out any residual suspended solids carried over from the Clarifier. This provides an additional measure of process integrity in the event of a process upset condition. Effluent flows by gravity from the micro-strainer into the sewer drain.
- .6 The overall process shall be controlled by a Programmable Logic Controller (PLC). The PLC receives inputs from flow, level, and process control monitoring equipment and controls the blower and valves based on the information received and interpreted.
- .7 The entire system and controls shall be installed within an Engineered modular building. The Engineered building is insulated, heated, ventilated, and includes appropriate lighting.
- .8 Engineered building, exterior colour to match (or close to) the colour of the new backup generator located on site.

- .1 Colour : Tiger Drylac Powder Coatings ral colors: RAL 7032.

Part 2 Products

2.1 SETTLING TANK

- .1 Aluminum construction (aluminum grade 5052, 5083, or 5086).
- .2 Open-topped rectangular construction.
- .3 Volume: 8 m³.
- .4 1829 mm L x 2134 mm W x 2134 mm H.
- .5 Drain connection: 3" flanged connection with manual butterfly valve and camlock truck-out connection.

2.2 AERATION TANK

- .1 Aluminum construction (aluminum grade 5052, 5083, or 5086).
- .2 Open-topped rectangular construction.
- .3 Aeration system including EDI FlexAir fine bubble diffusers, FPZ MD-series regenerative blower, Sch. 40 stainless steel piping (above the tank operating level), and Sch. 80 CPVC piping (below the tank operating level).
- .4 Volume: 8 m³.
- .5 1829 mm L x 2134 mm W x 2134 mm H.
- .6 Drain connection: 3" flanged connection with manual butterfly valve and camlock truck-out connection.

2.3 CLARIFIER

- .1 Aluminum Construction (aluminum grade 5052, 5083, or 5086).
- .2 Open-topped conical construction.
- .3 Volume: 3 m³.
- .4 Cone slope.
- .5 1676 mm top diameter (1422 mm bottom diameter) x 1524 mm overall height.
- .6 Drain connection: 3" flanged connection with manual butterfly valve and camlock truck-out connection.
- .7 Scum rake: SEW-Eurodrive, type RF37A.

2.4 MICRO-STRAINER

- .1 Rotary drum type strainer.
- .2 28 µm mesh screen.

2.5 PIPING

- .1 Process piping Schedule 80 PVC.

- .2 Air header piping 304 SS.

2.6 CONTROL PANEL

- .1 Schneider Modicon PLC.
- .2 C-More EA9-series colour touch-screen HMI.

2.7 BUILDING

- .1 Dimensions
 - .1 45'L x 10'W x 9'8"H.
- .2 Materials
 - .1 All materials shall be made of ASTM A36 carbon steel.
- .3 Tolerances
 - .1 Linear dimensions shall be ± 3 mm and shall not be cumulative.
- .4 Welding
 - .1 Welding materials and procedures shall be in accordance with CAN/CSA W59 and done by a welding shop certified to CAN/CSA W47.1.
 - .2 Items shall be fabricated with all joints tightly fitted and secured.
 - .3 Floor plate shall be seal welded on all sides and seams including between floor plates, between floor and wall panels, and between floor plate and end beams.
 - .4 Floor reinforcements shall be stitch welded to floor plate.
 - .5 All building modifications penetrating the building walls shall be seal welded.
 - .6 Exposed joints shall be ground flush and smooth with adjacent finished surface.
 - .7 Exposed edges and outside corners of materials shall be ground down smooth.
- .5 Interior Framing
 - .1 Interior walls and roof of building shall be framed with appropriate sized metal channels. Studs shall be framed as close to existing building walls as possible, leaving maximum interior space available.
- .6 Insulation
 - .1 Insulation on interior walls shall be 75mm Roxul insulation (R12).
 - .2 Insulation on interior roof shall be 125mm Roxul insulation (R20).
 - .3 Insulation on bottom of skid shall be 75mm Polyurethane spray foam (R20).
- .7 Cladding
 - .1 Interior cladding shall be minimum 26ga corrugated metal sheeting/paneling, 3mm corrugation preferred, maximum 6mm.
 - .2 Interior cladding color shall be white or approved equivalent color.
 - .3 Vapor barrier shall be installed between insulation and cladding.
- .8 Man Doors
 - .1 Man doors shall be 914mm wide x 2133mm high, insulated steel doors with weather stripping and spring fitted door chain retainer.

- .2 Man doors shall include 610mm x 610mm thermal pane window.
- .3 Man doors shall be lockable and shall be fitted with exterior thumb latch and interior panic bar.
- .9 End Doors
 - .1 Building shall have double doors on both ends unless noted otherwise (i.e.: Full height & full width building type doors).
- .10 Flooring
 - .1 Interior flooring shall be 6mm ASTM A36 carbon steel flat plate and shall span the entire width of the building.
- .11 Surface Preparation
 - .1 All surfaces to be primed or painted shall have surface prepared before application of primer or paint.
 - .2 Surface finish to be determined based on coating manufacturer recommendations. If not specified by the coating manufacturer the blast shall be to SSPC-SP6.
- .12 Painting
 - .1 Primer shall be applied to internal walls prior to framing and insulating.
 - .2 Floor plate shall be primed and painted grey or approved equivalent color.
 - .3 Floor shall include non-slip additive over entire surface, unless noted otherwise.
 - .4 Floor paint type shall be a high durability industrial epoxy. Epoxy manufacturer and type to be recommended by Fabricator and shall be approved by FilterBoxx. Paint shall be applied according to Manufacturers recommendations on quality control activities, dry film thickness, method of application, curing times, and curing temperatures.
 - .5 Exterior of building shall be painted white or approved equivalent color.
 - .6 Exterior paint type shall be recommended by Fabricator. Coating manufacturer and type to be recommended by Fabricator and shall be approved by FilterBoxx. Paint shall be applied according to Manufacturers recommendations on quality control activities, dry film thickness, method of application, curing times, and curing temperatures.

2.8 LIGHTING

- .1 Internal: Ten (10) 4' fluorescent fixtures.
- .2 External: Light fixture mounted above man door.
- .3 Emergency lighting in plant.

2.9 HEATING & VENTILATION

- .1 Heating: 1 x 10 KW, 30amp, 3 phase, 208 V, Ruffneck.
- .2 Ventilation: 1 x 10" air intake, 1x12" exhaust fan.

2.10 SYSTEM ELECTRICAL AND INSTRUMENTATION

- .1 UL and CSA approved.

- .2 208 VAC/3 Phase/ 60 hz.
- .3 NEMA 4 rating for all electrical items.

2.11 TIE IN CONNECTIONS

- .1 Influent – 3x 2” Male Camlocks.
- .2 Effluent – 1x 2” Male Camlock.
- .3 Sludge – Vacuum out of primary settling tank and aeration tank = 3” Male Camlock.

Part 3 Execution

3.1 INSTALLATION

- .1 Construct units in accordance with details indicated, plumb and true to alignment and grade, in accordance with OPSS 407. Maximum relative difference between specified invert elevations not to exceed 10 mm.
- .2 Install treatment unit directly onto cast-in-place concrete slab and as per Manufacturers recommendation.
- .3 Complete all appropriate connection, inlet, outlet, electrical, etc., in order to make unit operational.

3.2 TESTING

- .1 Standard Pump Factory Test
 - .1 Each completed and assembled pump/motor unit shall undergo the following factory tests at the manufacturer’s plant prior to shipment:
 - .1 Minimum 3-point hydraulic performance test.
 - .2 No-Leak seal integrity test.
 - .3 Electrical integrity test.
- .2 Field Start-up
 - .1 After installation, a pump station start-up shall be performed by the installing contractor under the supervision of the manufacture’s authorized representative. 1 days of field service shall be provided by an authorized, factory trained representative of the pump manufacturer. Services shall include, but not be limited to, inspection of the completed pump station installation to ensure that it has been performed in accordance with the manufacturer’s instructions and recommendations, supervision of all field-testing and activation of the Pump Manufacturer’s Warranty. The test shall demonstrate to the satisfaction of the Owner that the equipment meets all specified performance criteria, is properly installed and anchored, and operates smoothly without exceeding the full load amperage rating of the motor. The Contractor shall be responsible for coordinating the required field services with the Pump Manufacturer.

3.3 WARRANTY

- .1 Station Warranty

- .1 The Pump Manufacturer shall Warrant to the Owner the treatment unit components against defects in material and workmanship for a period of 1 year from date of start-up or 18 months from date of shipment, whichever is sooner. This warranty shall cover the cost of labor and materials, excluding removal and reinstallation costs, required to correct any warrantable defect, FOB, Manufacturer's authorized warranty service location.
- .2 Pump & Control Warranty
 - .1 Manufacturer's standard warranty covers the pump and control system.
- .3 Operations Manual
 - .1 Manufacturer to provide three (3) copies of the operation and maintenance manual in hard copy and one (1) electronic version.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 03 30 00 - Cast-in-Place Concrete.
- .3 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .4 Section 32 11 16.01 – Granular Sub-Base.
- .5 Section 32 11 23 – Aggregate Base Courses.
- .6 Section 33 41 00 – Storm Utility Drains.

1.2 MEASUREMENT PROCEDURES

- .1 Included in Balance of Project.

1.3 REFERENCES

- .1 American National Standards Institute/American Water Works Association (ANSI/AWWA)
 - .1 ANSI/AWWA C104/A21.4-95, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 - .2 ANSI/AWWA C111/A21.11-00, Rubber-Gasket Joints for Ductile-Iron and Gray Iron Pressure Pipe and Fittings.
 - .3 ANSI/AWWA C110/A21.10-98, Ductile-Iron and Gray Iron Fittings, 3 inch through 48 inch (75 mm through 1200 mm), for Water.
 - .4 ANSI/AWWA C150/A21.50-02, Thickness Design of Ductile-Iron Pipe.
 - .5 ANSI/AWWA C151/A21.51-02, Ductile-Iron Pipe, Centrifugally Cast, for Water.
 - .6 ANSI/AWWA C153/A21.53-00, Ductile-Iron Compact Fittings for Water Service.
 - .7 ANSI/AWWA C502-94, Dry-Barrel Fire Hydrants.
 - .8 ANSI/AWWA C504-00, Rubber-Seated Butterfly Valves.
 - .9 ANSI/AWWA C504-94, Resilient-Seated Gate Valves for Water Supply Services.
 - .10 ANSI/AWWA C550-90, Protective Epoxy Interior Coatings for Valves and Hydrants.
 - .11 ANSI/AWWA C600-99, Installation of Ductile-Iron Water Mains, and Their Appurtenances.
 - .12 ANSI/AWWA C800-01, Underground Service Line Valves and Fittings (Also Included: Collected Standards for Service Line Materials).

- .13 ANSI/AWWA C900-97, Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 Inch through 12 Inch (100 mm - 300 mm), for Water Distribution.
- .2 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM A53/A53M-02, Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
 - .2 ASTM A307-02, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
 - .3 ASTM B88M-99, Standard Specification for Seamless Copper Water Tube Metric.
 - .4 ASTM C478M-97, Standard Specification for Precast Reinforced Concrete Manhole Sections Metric.
 - .5 ASTM D698-00a, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft (600 kN-m³)).
 - .6 ASTM F714-13, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
- .3 American Water Works Association (AWWA)/Manual of Practice
 - .1 AWWA M17-1989, Installation, Field Testing, and Maintenance of Fire Hydrants.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.
 - .2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA B137 Series-02, Thermoplastic Pressure Piping Compendium. (Consists of B137.0, B137.1, B137.2, B137.3, B137.4, B137.4.1, B137.5, B137.6, B137.8, B137.9, B137.10, B137.11 and B137.12).
 - .1 CSA B137.3-02, Rigid Polyvinyl Chloride (PVC) Pipe for Pressure Applications.
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S520-1991, Hydrants.
 - .2 CAN4-S543-1984, Internal-Lug, Quick Connect Couplings for Fire Hose.
- .7 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 1351 (November 2014) Material Specification for Precast Reinforced Concrete Components for Maintenance Holes, Catch Basins, Ditch Inlets and Valve Chambers.
- .8 National Fire Protection Association (NFPA)
 - .1 NFPA 291 (2010): Recommended Practice for Fire Flow Testing and Marking of Hydrants.

1.4 STANDARDS

- .1 All water main materials and workmanship to be in accordance with City of Ottawa Standards. W refers to City of Ottawa Standard drawings.

1.5 MATERIAL CERTIFICATION

- .1 Submit manufacturer's certification that pipe materials meet requirements of this section at least 1 week prior to commencing work. Include manufacturer's drawings, information and shop drawings where pertinent.

1.6 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Provide shop drawings for the following:
 - .1 Valve boxes
- .3 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.
- .4 Provide product data for the following:
 - .1 Pipe
 - .2 Fittings
 - .3 Hydrants
 - .4 Valves
 - .5 Valve Boxes
 - .6 Retaining and restraining rings and associated hardware

1.7 CLOSEOUT SUBMITTALS

- .1 Provide record drawings, including directions for operating valves, list of equipment required to operate valves, details of pipe material, location of air and vacuum release valves, hydrant details, maintenance and operating instructions in accordance with Section 01 78 00 - Closeout Submittals.
 - .1 Include top of pipe, horizontal location of fittings and type, valves, valve boxes, valve chambers and hydrants.

1.8 SCHEDULING OF WORK

- .1 Schedule Work to minimize interruptions to existing services.
- .2 Water service to building must not be interrupted.
- .3 Submit schedule of expected interruptions to Departmental Representative for approval and adhere to interruption schedule as approved by Departmental Representative.
- .4 Notify Departmental Representative minimum of 72 h in advance of interruption in service.

- .5 Do not interrupt water service for more than 3 h and confine this period between 18:00 and 07:00 h local time unless otherwise authorized by Departmental Representative.
- .6 Notify fire department of any planned or accidental interruption of water supply to hydrants.
- .7 Provide "Out of Service" sign on hydrant not in use.

Part 2 Products

2.1 PIPE

- .1 For Open Cut Installation:
 - .1 Polyvinyl chloride pressure pipe: to CSA B137.3 and AWWA C900 for pipe sizes 305 mm diameter and less and to AWWA C-905 for 406 mm diameter pipe, pressure class 150, DR 18, 1 MPa, cast iron outside diameter, blue in color and supplied with gaskets.
 - .1 Approved for use by the City of Ottawa.
 - .2 Push-on joints as per AWWA C-111, complete with vulcanized synthetic rubber gaskets.

2.2 FITTINGS

- .1 Fittings:
 - .1 Short body ductile iron fittings: to AWWA C153.
 - .1 Cement lined per AWWA C-104.
 - .2 Mechanical or push-on joint.
 - .2 PVC fittings to AWWA C907 and CSA B137.3.
 - .1 Push-on joints.

2.3 RESTRAINING AND RETAINING RINGS

- .1 For use on PVC pipe:
 - .1 The restraining devices shall meet the minimum requirements of ASTM F1674, have a working pressure of 1035 kPa complete with minimum 2:1 safety factor.
 - .2 Retaining rings are to be designed for use with their respective pipe and fitting size and class. The restraint mechanism shall incorporate a series of machined serrations on the inside diameter of the clamping ring.
 - .1 The rings are to be manufactured from high quality ductile iron per ASTM A536, Grade 65-45-12.
 - .2 T-bolts, clamping bolts and nuts, type 304 stainless steel per ASTM F593.
 - .3 Approved for use by the City of Ottawa.

2.4 COUPLINGS

- .1 Couplings designed to withstand a hydrostatic test pressure of 1035 kPa.
 - .1 Center Sleeve:
 - .1 Material:
 - .1 Steel sleeves – carbon steel as per ASTM A36/A53/A512, minimum yield strength of 207 MPa.
 - .2 Cast sleeves – ductile iron as per ASTM A536, grade 64-45-12.
 - .3 Finish: shop finish enamelled.
 - .4 Ends to be smooth inside surface for uniform gasket seating.
 - .1 Minimum lengths:
 - .1 203 mm pipe and smaller: 152 mm.
 - .2 305 mm pipe: 203 mm.
 - .3 406 mm pipe: 228 mm.
 - .2 End Rings: ductile iron to ASTM A536.
 - .3 Nuts and Bolts: type 304 stainless steel per ANSI/AWWA C-111/A21.115, 25 mm diameter.
 - .4 Gasket: grade 30 special compound rubber (SBR) recommended for water, salt solution, mild acids and bases with a temperature range between -40°C to +65°C.
 - .5 Approved for use by City of Ottawa Standards.

2.5 VALVES

- .1 Valves to open clockwise.
- .2 Gate valves to ANSI/AWWA C509, resilient seated:
 - .1 Application – for use on all 152mm and 305 mm diameter water main.
 - .2 Material:
 - .1 Cast iron to ASTM A126, class B narrow body design.
 - .2 Ductile iron to ASTM A536, short body design.
 - .3 Non-rising stem, complete with 50 mm square operating nut in the vertical position, standard O-ring type steam seal.
 - .4 Pressure rating – minimum 1380 kPa.
 - .5 Finish: two part spray epoxy coating or a fusion bonded epoxy coating, factory applied to exterior and interior surfaces in accordance with ANSI/AWWA C550.
 - .6 Joints:
 - .1 For Polyethylene pipe:
 - .1 Flanged joint ends to ANSI/AWWA C110/A21.10.
 - .2 Valve flanges to be flat faced, parallel and concentric.
 - .2 For PVC or FPVC pipe:

- .1 Mechanical joint ends to ANSI/AWWA C111/A21.11, complete with cast iron gland rings, stainless steel nuts and bolts, Type 304 or 316, and gasket.

2.6 VALVE BOXES

- .1 Cast iron valve boxes: 130 mm screw type manufactured from good quality grey iron to City of Ottawa Standards.
- .2 Valve boxes to consist of six elements – base, bottom section, extension, top section, cap and guide wheel, in accordance with City of Ottawa standard drawing number W-24.

2.7 VALVE CHAMBERS

- .1 Gate Valve Chamber
 - .1 Precast reinforced concrete, components in accordance with OPSS 131 and ASTM C478M, and the following City of Ottawa standard drawings:
 - .1 Base section to W-5.
 - .2 Chamber section to W-6.
 - .3 Adjustment units to W-9.
 - .4 Circular Chamber to W-3.
 - .5 Top section to W-8.
 - .2 Backflow Preventer Valve Chamber
 - .1 Precast reinforced concrete, components in accordance with OPSS 131 and ASTM C478M.
 - .2 Modified R-2 chamber in accordance with City of Ottawa standard drawings W-10, W-14, W-14.1, complete with precast chimney as detailed in OPSD 1101.015.
 - .3 Cast ladder rungs integral with unit; field installation not permitted.
 - .4 Frame and cover:
 - .1 Manufactured from good quality grey iron and shall be solid with clean surfaces, free from scales, lumps, flaws, blow holes, or other defects. No plugging or filling of defects or other methods of correcting defects shall be permitted.
 - .2 Castings shall be in accordance with ASTM A 48M, Class No. 30B.
 - .3 Cover to be marked “WATER”.
 - .4 Castings to be thoroughly coated with approved casting paint.
 - .5 Gate Valve Chamber:
 - .1 Castings to conform to dimensions of W-15 and W-16.
 - .6 Backflow Preventer Valve Chamber:
 - .1 Castings to conform to dimensions of OPSD 402.030.

2.8 BALL VALVES

- .1 Ball valves for use on test tees:

- .1 Bod and cap: cast high tensile bronze to ASTM B 62.
- .2 Pressure rating: Class 125, 860 kPa steam, WP = 1.4 MPa WOG.
- .3 Connections: Screwed ends to ANSI B1.20.1 and with hex shoulders.
- .4 Stem: tamperproof ball drive.
- .5 Stem packing nut: external to body.
- .6 Ball and seat: replaceable hard chrome solid ball and Teflon seats.
- .7 Stem seal: TFE with external packing nut.
- .8 Operator: removable lever handle.

2.9 HYDRANTS

- .1 Post type hydrants: dry barrel, compression, open against pressure, dry top, three way type with two 64 mm hose outlet nozzles and one 127 mm pumper outlet nozzle.
- .2 Hydrants, to CAN/ULC-S520, ANSI/AWWA C502, and approved for use by City of Ottawa.
- .3 Designed for a minimum working pressure of 1035 kPa.
- .4 The upper and lower barrels shall be ductile iron complete with breakable flange and breakable bolts.
- .5 Main valve: nominal diameter valve opening shall be a minimum of 127 mm.
- .6 Drain valve: the hydrant is to be provided with a drain valve that closes as the main valve opens.
- .7 Inlet connection to be mechanical joint, 152 mm bell at base of hydrant to ANSI/AWWA C111/A21.11, complete with cast iron gland rings, stainless steel nuts and bolts, Type 304 or 316, and gaskets. The base configuration and mechanical joint to be designed to accept retaining/restraining devices for both AWWA C150 CL 52 ductile iron pipe and ANSI/AWWA C900, DR 18 PVC pipe hydrant leads.
- .8 Bury length: Type D of City of Ottawa Standards in accordance with W-19.
- .9 Hose outlet nozzle: 4 mm hose outlet nozzles conforming to ULC S-513 and approved for use by City of Ottawa.
- .10 Pumper Outlet Nozzle: approved for use by City of Ottawa.
- .11 Operator Nut: 32 mm square, direction to open to be counter-clockwise.
- .12 The hydrant is to be factory primed and finished painted. Hydrant finish paint: colour red, exterior enamel to CAN/CGSB-1.88.

2.10 CATHODIC PROTECTION

- .1 Anodes are to be attached to all new ductile iron fittings, ductile iron pipe, and valves. The size and type of anode to be in accordance with City of Ottawa Standards and W-39, W-40, W-41, and W-42, M.S. No. MW-19.9 and S.P. F-No. F-7093.

2.11 BOLT CORROSION PROTECTION

- .1 Anti-corrosion petrolatum paste, tape and mastic approved for use by City of Ottawa and in accordance with ANSI/AWWA C217.

2.12 HYDROSATIC TEES

- .1 Ensure two test tees are provided in each valve chamber, upstream and downstream of the valve, as per W-34.
- .2 52 mm diameter.

2.13 PIPE BEDDING AND SURROUND MATERIAL

- .1 Granular material to: Section 32 11 23 – Aggregate Base Courses.

2.14 GEOTEXTILES

- .1 Geotextile: Non-Woven, Class II, in accordance with OPSS 1860. Filtration opening size (FOS): maximum 70µm as per CAN/CGSB 148.1, Method No. 10.

2.15 INSULATION

- .1 Expanded polystyrene: to CAN/CGSB-51.20, Type 4, with 275 kPa compressive strength to ASTM D 1621, shiplapped edges, thickness as indicated.

2.16 BACKFILL MATERIAL

- .1 Type 1, in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.

Part 3 Execution**3.1 PREPARATION**

- .1 Clean pipes, fittings, valves, hydrants, and appurtenances of accumulated debris and water before installation.
 - .1 Inspect materials for defects to approval of Departmental Representative.
 - .2 Remove defective materials from site as directed by Departmental Representative.
- .2 Ensure pipes delivered to site are provided with end caps and tamper evident seals.
- .3 Only remove end caps immediately before pipe is to be installed.

3.2 OPEN CUT TRENCH INSTALLATION

- .1 Trenching
 - .1 Do trenching work in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
 - .2 Trench depth to provide cover over pipe of not less than 2.4 m from finished grade or as indicated.
 - .3 Trench alignment and depth require Departmental Representative's approval prior to placing bedding material and pipe.
- .2 Geotextile: install as indicated.
- .3 Granular Bedding
 - .1 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth of 150 mm below bottom of pipe.
 - .2 Do not place material in frozen condition.
 - .3 Shape bed true to grade to provide continuous uniform bearing surface for pipe.
 - .4 Shape transverse depressions in bedding as required to suit joints.
 - .5 Compact each layer full width of bed to at least 95% maximum density to ASTM D698.
 - .6 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33.01 - Excavating Trenching and Backfilling.
- .4 Pipe Installation
 - .1 Terminate building water service 1 m outside building wall or at property line opposite point of connection to main. Install coupling necessary for connection to building plumbing. If plumbing is already installed, make connection; otherwise cap or seal end of pipe and place temporary marker to locate pipe end.
 - .2 Lay pipes to ANSI/AWWA C600 and manufacturer's standard instructions and specifications. Do not use blocks except as specified.
 - .3 Join pipes in accordance with ANSI/AWWA C600 and manufacturer's recommendations.
 - .4 Bevel or taper ends of PVC pipe to match fittings.
 - .5 Handle pipe by methods recommended by pipe manufacturer. Do not use chains or cables passed through pipe bore so that weight of pipe bears on pipe ends.
 - .6 Lay pipes on prepared bed, true to line and grade.
 - .1 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
 - .2 Take up and replace defective pipe.
 - .3 Correct pipe which is not in true alignment or grade or pipe which shows differential settlement after installation greater than 10 mm in 3 m.
 - .7 Face socket ends of pipe in direction of laying. For mains on grade of 2% or greater, face socket ends up-grade.

- .8 Do not exceed permissible deflection at joints as recommended by pipe manufacturer.
 - .9 Keep jointing materials and installed pipe free of dirt and water and other foreign materials.
 - .1 Whenever work is stopped, install a removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
 - .10 Position and join pipes with equipment and methods approved by Departmental Representative.
 - .11 Cut pipes in approved manner as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
 - .12 Align pipes before jointing.
 - .13 Install gaskets to manufacturer's recommendations. Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .14 Avoid displacing gasket or contaminating with dirt or other foreign material.
 - .1 Remove disturbed or contaminated gaskets.
 - .2 Clean, lubricate and replace before jointing is attempted again.
 - .15 Complete each joint before laying next length of pipe.
 - .16 Minimize deflection after joint has been made.
 - .17 Apply sufficient pressure in making joints to ensure that joint is completed to manufacturer's recommendations.
 - .18 Ensure completed joints are restrained by compacting bedding material alongside and over installed pipes or as otherwise approved by Departmental Representative.
 - .19 When stoppage of work occurs, block pipes in an approved manner to prevent creep during down time.
 - .20 Recheck plastic pipe joints assembled above ground after placing in trench to ensure that no movement of joint has taken place.
 - .21 Do not lay pipe on frozen bedding.
- .5 Pipe Surround
- .1 Upon completion of pipe laying and after Departmental Representative has inspected Work in place, surround and cover pipes as indicated.
 - .2 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
 - .3 Place layers uniformly and simultaneously on each side of pipe.
 - .4 Do not place material in frozen condition.
 - .5 Compact each layer from pipe invert to pipe spring line to 95% maximum density to ASTM D698.
 - .6 From pipe spring line to 300 mm above top of pipe hand tamp material. Do not use mechanical tampers directly over pipe where cover is less than 300 mm.
- .6 Backfill remainder of trench.

3.3 INSULATION

- .1 Install insulation in accordance with W-23.

3.4 VALVE INSTALLATION

- .1 Install valves to manufacturer's recommendations at locations as indicated.
- .2 Support valves located in valve boxes or valve chambers by means of concrete blocks, located between valve and solid ground. Bedding same as adjacent pipe. Valves not to be supported by pipe.

3.5 VALVE BOXES

- .1 Install as indicated to W-24.
- .2 Ensure valve boxes are centered over valve, vertical and free of debris.

3.6 VALVE CHAMBERS

- .1 Use precast units as approved by Departmental Representative.
- .2 Construct units as indicated, plumb and centred over valve nut, true to alignment and grade, and not resting on pipe.
 - .1 For Gate Valves, Refer to W-3.
- .3 Set precast concrete bases on 150 mm minimum compacted granular base material.
- .4 Set chamber section of precast unit on top of precast bases.
- .5 Set precast top section over chamber section.
- .6 Install adjustment units over valve chamber precast top. Set frame and cover directly n adjustment units. Do not use shims.
- .7 Plug lifting holes with precast concrete plugs set in cement mortar.
- .8 Place frame and cover on top section to elevation indicated. If adjustment is required use concrete ring.
- .9 Clean valve chambers of debris and foreign materials; remove fins and sharp projections.

3.7 WATER MAIN CROSSINGS

- .1 Prior to undertaking a crossing, daylight existing utility by means of vacuum excavation to confirm utility elevation and location.
- .2 Provide the clearances as indicated.

3.8 TEST TEES

- .1 Install test tees complete with ball valves as indicated and to accommodate flushing and disinfection, refer to W-34.

3.9 HYDRANTS

- .1 Install hydrants at locations as indicated.
- .2 Install hydrants in accordance with AWWA Manual of Practice and in conformance with City of Ottawa Standards. Refer to W-18 and W-19.
- .3 Install 152 mm gate valve and cast iron valve box on hydrant service leads as indicated to be 152 mm and in accordance with W-19.
- .4 Handle hydrants with appropriate slings and harness to avoid damage to painted surfaces. Any damage to paint work is to be repaired to the satisfaction of the Departmental Representative.
- .5 Set hydrants plumb, with hose outlets parallel with edge of pavement or curb line, with pumper connection facing roadway and with breakable flange set at elevation of 50 - 100 mm above final grade.
- .6 Restrain the hydrant lead at the tee connection to the main, on both sides of the valve, and at the base connection of the hydrant. In addition, provide a concrete thrust block as indicated in W-19 against undisturbed soil.
- .7 Ensure the drain holes are kept open and surrounded with clear stone.
- .8 Place appropriate sign on installed hydrants indicating whether or not they are in service during construction.

3.10 RESTRAINED JOINTS

- .1 Restrain joints at all bends, tees, and valves in accordance with W-25.5 and W-25.6.

3.11 CATHODIC PROTECTION

- .1 All fittings are to be provided with cathodic protection in accordance with W-39, W-40, W-41, and W-42.

3.12 BOLT CORROSION PROTECTION

- .1 Liberally apply anti-corrosion petrolatum paste tape and mastic to all exposed nuts and bolts.

3.13 TRACER WIRE

- .1 Install tracer wire in accordance with W-36.

3.14 HYDROSTATIC AND LEAKAGE TESTING

- .1 Do tests in accordance with City of Ottawa Standards F-7090-Commissioning of Watermains.
- .2 Provide labour, equipment and materials required to perform hydrostatic and leakage tests.
- .3 Notify Departmental Representative at least 48 hours in advance of proposed tests.
 - .1 Perform tests in presence of Departmental Representative.
- .4 When testing is done during freezing weather, protect hydrants, valves, joints and fittings from freezing.
- .5 Open valves.
- .6 Expel air from main by slowly filling main with potable water. Install corporation stops at high points in main where no air-vacuum release valves are installed. Remove stops after satisfactory completion of test and seal holes with plugs.
- .7 Remove joints, fittings and appurtenances found defective and replace with new sound material and make watertight.
- .8 Repeat hydrostatic test until all defects have been corrected and until leakage is within specified allowance for full length of watermain being tested.

3.15 BACKFILL

- .1 Refer to Section 31 23 33.01 – Excavating, Trenching and Backfilling.

3.16 HYDRANT FLOW TESTS

- .1 Undertake fire flow tests as per AWWA Manual M17 at each hydrant upon completion of installation, witnessed by Departmental Representative. Notify Departmental Representative a minimum of 48 hours in advance prior to undertaking test.

3.17 PAINTING OF HYDRANTS

- .1 After installation, touch up factory applied paint to satisfaction of Departmental Representative.
- .2 Paint hydrant caps and bonnets in accordance with NFPA 291 based on flow test results.

3.18 FLUSHING AND DISINFECTING

- .1 Flushing and disinfecting operations shall be undertaken by the City of Ottawa. Contractor will be responsible for obtaining and coordinating the services of the City of Ottawa. The Contractor shall include all costs in the tender amount and compensate the City for all related flushing and disinfecting fees.

3.19 CONNECTION TO CITY OF OTTAWA WATERMAIN

- .1 The connection to the City of Ottawa Sussex Drive Main will be by City of Ottawa forces under separate contract. Refer to Contract Drawings for location of water main connections.

3.20 SURFACE RESTORATION

- .1 After installing and backfilling over water mains, restore surface to original condition as directed by Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .3 Section 32 11 23 – Aggregate Base Courses.
- .4 Section 33 05 13 – Manholes and Catch Basin Structures.

1.2 MEASUREMENT PROCEDURES

- .1 Included in Balance of Project.

1.3 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM D698-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- .2 Canadian Standards Association (CSA International)
 - .1 CSA B1800-02, Plastic Non-pressure Pipe Compendium - B1800 Series (Consists of B181.1, B181.2, B181.3, B181.5, B182.1, B182.2, B182.4, B182.6, B182.7, B182.8 and B182.11).
 - .1 CSA B182.1-02, Plastic Drain and Sewer Pipe and Pipe Fittings.
 - .2 CSA B182.2-02, PVC Sewer Pipe and Fittings (PSM Type).
 - .3 CSA B182.11-02, Recommended Practice for the Installation of Thermoplastic Drain, Storm, and Sewer Pipe and Fittings.
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS 409 (November 2013) Construction Specification For Closed-Circuit Television (CCTV) Inspection Of Pipelines.

1.4 SUBMITTALS

- .1 Submit product literature for storm sewer pipe in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Certification to be marked on pipe.

Part 2 Products

2.1 OPEN CUT PIPE

- .1 For pipe diameters up to and including 450 mm diameter:
 - .1 Plastic Pipe:
 - .1 Type PSM Polyvinyl Chloride (PVC): to CSA-B182.2.
 - .2 Standard Dimensional Ratio (SDR): 35.
 - .3 Locked-in gasket and integral bell system.
 - .4 Nominal lengths: 4m.

2.2 PIPE BEDDING AND SURROUND MATERIAL OPEN CUT

- .1 Granular base material: refer to Section 32 11 23 – Aggregate Base Courses.

2.3 BACKFILL MATERIAL OPEN CUT

- .1 Type 1 Fill to Section 31 23 33.01 - Excavating Trenching and Backfilling.

Part 3 Execution

3.1 PREPARATION

- .1 Clean pipes and fittings of debris and water before installation, and remove defective materials from site to approval of Departmental Representative.

3.2 OPEN CUT TRENCHING

- .1 Trenching:
 - .1 Do trenching Work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
 - .2 Do not allow contents of sewer or sewer connection to flow into trench.
 - .3 Trench alignment and depth to approval of Departmental Representative prior to placing bedding material and pipe.
- .2 Granular Bedding:
 - .1 Place bedding in unfrozen condition.
 - .2 Place granular bedding material in uniform layers not exceeding 150 mm compacted thickness to depth as indicated up to spring line of pipe.
 - .3 Shape bed true to grade and to provide continuous, uniform bearing surface for pipe.
 - .1 Do not use blocks when bedding pipes.
 - .4 Shape transverse depressions as required to suit joints.
 - .5 Compact each layer full width of bed to at least 95 % maximum density to ASTM D698.

- .6 Fill excavation below bottom of specified bedding adjacent to manholes or catch basins structures with compacted bedding material.
- .7 Fill authorized or unauthorized excavation below design elevation of bottom of specified bedding in accordance with Section 31 23 33.01 – Excavation, Trenching and Backfilling.
- .3 Pipe Installation:
 - .1 Lay and join pipe in accordance with manufacturer's recommendations and to approval of Departmental Representative.
 - .2 Handle pipe using methods approved by pipe manufacturer.
 - .1 Do not use chains or cables passed through rigid pipe bore so that weight of pipe bears upon pipe ends.
 - .3 Lay pipes on prepared bed, true to line and grade with pipe inverts smooth and free of sags or high points.
 - .1 Maximum allowable variation from indicated pipe invert elevations as measured at the maintenance holes and catch basins not to exceed 10 mm.
 - .2 Ensure barrel of each pipe is in contact with shaped bed throughout its full length.
 - .4 Begin laying at outlet and proceed in upstream direction with socket ends of pipe facing upgrade.
 - .5 Do not exceed maximum joint deflection recommended by pipe manufacturer.
 - .6 Do not allow water to flow through pipes during construction except as may be permitted by Departmental Representative.
 - .7 Whenever Work is suspended, install removable watertight bulkhead at open end of last pipe laid to prevent entry of foreign materials.
 - .8 Install plastic pipe and fittings in accordance with CSA B182.11.
 - .9 Joints:
 - .1 Plastic pipe:
 - .1 Gaskets integral with pipe.
 - .2 Support pipes with hand slings or crane as required to minimize lateral pressure on gasket and maintain concentricity until gasket is properly positioned.
 - .3 Align pipes before joining.
 - .4 Maintain pipe joints free from mud, silt, gravel and other foreign material. Lubricate gaskets before jointing is attempted.
 - .5 Avoid displacing gasket or contaminating with dirt or other foreign material. Do not install pipes with damaged or disturbed gaskets.
 - .6 Complete each joint before laying next length of pipe.
 - .7 Minimize joint deflection after joint has been made to avoid joint damage.
 - .8 Apply sufficient pressure in making joints to ensure that joint is complete as outlined in manufacturer's recommendations.

- .10 When any stoppage of Work occurs, restrain pipes to prevent "creep" during down time.
 - .11 Cut pipes as required for special inserts, fittings or closure pieces, as recommended by pipe manufacturer, without damaging pipe or its coating and to leave smooth end at right angles to axis of pipe.
 - .12 Make watertight connections to manholes and catch basins.
 - .13 Temporarily plug open upstream ends of pipes with removable watertight concrete, steel or plastic bulkheads.
- .4 Pipe Surround
- .1 Place surround material in unfrozen condition.
 - .2 Upon completion of pipe laying, and after Departmental Representative has inspected pipe joints, surround and cover pipes as indicated.
 - .3 Hand place surround material in uniform layers not exceeding 150 mm compacted thickness as indicated.
 - .1 Do not dump material within 1 m of pipe.
 - .4 Place layers uniformly and simultaneously on each side of pipe.
 - .5 Compact each layer from pipe invert to mid height of pipe to at least 95 % maximum density to ASTM D698.
 - .6 Compact each layer from mid height of pipe to underside of backfill to at least 90% maximum density to ASTM D698.
- .5 Backfill
- .1 Place backfill material in unfrozen condition.
 - .2 Place backfill material, above pipe surround, in uniform layers not exceeding 150 mm compacted thickness up to grades as indicated.
 - .3 Under paving and walks, compact backfill to at least 95 % maximum density to ASTM D698. In other areas, compact backfill to at least 90 % maximum density to ASTM D698.

3.3 FIELD TESTING

- .1 Repair or replace pipe, pipe joint or bedding found defective.
- .2 When directed by Departmental Representative, draw tapered wooden plug with diameter of 50 mm less than nominal pipe diameter through sewer to ensure that pipe is free of obstruction.
- .3 Remove foreign material from sewers and related appurtenances by flushing with water.
- .4 Television and photographic inspections:
 - .1 Carry out Closed Circuit Television (CCTV) inspection of all new storm sewers, 200mm diameter or larger, in accordance with OPSS 409. Three (3) copies of the CCTV tapes and reports shall be submitted to the Departmental Representative.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA C22.2 No. 211.1-M1984(R1999), Rigid Types EBI and DB2/ES2 PVC Conduit.

1.3 SUBMITTALS

- .1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Place materials defined as hazardous or toxic in designated containers.
- .5 Fold up metal banding, flatten and place in designated area for recycling.
- .6 Do not dispose of preservative treated wood through incineration.
- .7 Do not dispose of preservative treated wood with other materials destined for recycling or reuse. Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill as approved by Engineer.
- .8 Dispose of unused wood preservative material at official hazardous material collections site. Do not dispose of unused preservative material into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.
- .9 Dispose of unused solvent cement at an official hazardous material collections sites as approved by Engineer. Do not dispose of unused solvent cement into sewer system, into streams, lakes, onto ground or in other location where they will pose health or environmental hazard.

Part 2 Products

2.1 PVC DUCTS AND FITTINGS

- .1 Rigid PVC duct: to CSA C22.2 No. 211.1, Type DB2/ES2, with fabricated fittings, for direct burial.
- .2 Rigid PVC split ducts.
- .3 Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make complete installation.
- .4 Rigid PVC 90° and 45° bends.
- .5 Rigid PVC 5° angle couplings.
- .6 Expansion joints as required.

2.2 SOLVENT WELD COMPOUND

- .1 Solvent cement for PVC duct joints.

2.3 CABLE PULLING EQUIPMENT

- .1 6 mm stranded nylon pull rope tensile strength 5 kN.

2.4 MARKERS

- .1 Concrete type cable markers: as indicated, with words: "Cable", "Joint" or "Conduit" impressed in top surface, with arrows to indicate change in direction of duct runs.

PART 3 Execution

3.1 INSTALLATION

- .1 Install duct in accordance with manufacturer's instructions.
- .2 Clean inside of ducts before laying.
- .3 Ensure full, even support every 1.5 m throughout duct length.
- .4 Slope ducts with 1 to 400 minimum slope.
- .5 During construction, cap ends of ducts to prevent entrance of foreign materials.
- .6 Pull through each duct wooden mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign matter. Pull stiff bristle brush through each duct immediately before pulling-in cables.

- .7 In each duct install pull rope continuous throughout each duct run with 3 m spare rope at each end.
- .8 Install markers as required.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Provision of rigid conduit underground service ducts.

1.2 RELATED SECTIONS

- .1 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Section 33 65 76 - Direct Buried Underground Cable Ducts.
- .3 Section 26 05 00 - Common Work Results - Electrical.
- .4 Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts.
- .5 Section 26 05 28 - Grounding - Secondary.
- .6 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA)
 - .1 CSA A23.1/A23.2-00(June 2001), Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete.

1.4 REGULATORY REQUIREMENTS

- .1 Co-ordinate and meet requirements of power supply authority. Ensure availability of power when required.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

Part 2 Products

2.1 MATERIALS

- .1 Underground ducts: to Section 33 65 76 - Direct Buried Underground Cable Ducts, rigid type, size as indicated.
- .2 Conductors: copper, type RWU-90, to Section 26 05 21, size and number of conductors as indicated.

Part 3 Execution

3.1 INSTALLATION

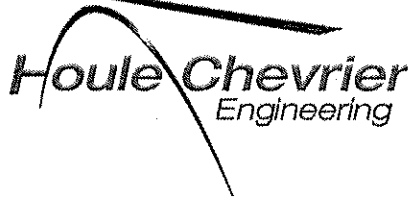
- .1 Install cables in trenches and in ducts in accordance with Section 26 05 43.01 - Installation of Cables in Trenches and in Ducts.
- .2 Allow adequate conductor length for connection to supply.
- .3 Allow adequate conductor length for connection to light standards.
- .4 Make grounding connections in accordance with Section 26 05 28 - Grounding - Secondary.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- .2 Perform additional tests if required by authority having jurisdiction.

END OF SECTION

Houle Chevrier Engineering Ltd
Report No.:13-337



Houle Chevrier Engineering Ltd.

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November 27, 2013

Our ref: 13-337

Delcan Corporation
100 - 123 Michael Street
Ottawa, Ontario
K1J 7T2

Attention: Mr. Joe Vincelli, P.Eng.

RE: GEOTECHNICAL INVESTIGATION
WATERMAIN REPLACEMENT AND PARKING AREA AND
SERVICE ROAD REHABILITATION
NATIONAL RESEARCH COUNCIL CANADA – SUSSEX DRIVE CAMPUS
100 SUSSEX DRIVE
OTTAWA, ONTARIO

Dear Sir:

Please find attached the geotechnical investigation report for the proposed watermain replacement and parking area and service road rehabilitation project at the National Research Council Canada Sussex campus, located at 100 Sussex Drive in Ottawa, Ontario.

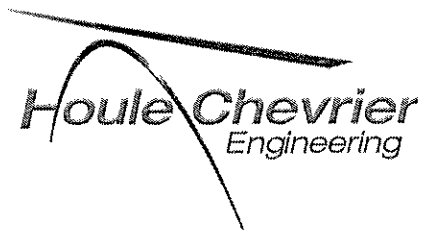
We trust that this report provides sufficient information for your current purposes. If you have any questions concerning the report, please call.

Yours truly,

HOULE CHEVRIER ENGINEERING LTD.

A handwritten signature in black ink, appearing to read "B. Wiebe", is written over the company name.

Brent Wiebe, P.Eng.



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REPORT ON

GEOTECHNICAL INVESTIGATION
WATERMAIN REPLACEMENT AND PARKING AREA AND
SERVICE ROAD REHABILITATION
NATIONAL RESEARCH COUNCIL CANADA
SUSSEX DRIVE CAMPUS
100 SUSSEX DRIVE
OTTAWA, ONTARIO

Submitted to:

Delcan Corporation
100 – 1223 Michael Street
Ottawa, Ontario
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November 2013

Our ref: 13-337

TABLE OF CONTENTS

Section	Page
1.0 INTRODUCTION	1
2.0 PROJECT AND SITE DESCRIPTION.....	2
2.1 Project Description	2
2.2 Review of Geology Maps.....	2
2.3 Previous Investigations by Houle Chevrier Engineering Ltd.....	2
3.0 SUBSURFACE INVESTIGATION	3
4.0 SUBSURFACE CONDITIONS	5
4.1 General	5
4.2 Previous Investigation (Boreholes 12-2 and 12-3)	5
4.3 Existing Pavement Structure	6
4.4 Topsoil Fill	7
4.5 Fill Material	7
4.6 Possible Fill Material.....	7
4.7 Sand and Gravel.....	8
4.8 Clayey Silt	8
4.9 Bedrock	8
4.10 Groundwater Levels	9
4.11 Groundwater Chemistry Relating to Corrosion	9
5.0 DESIGN GUIDELINES.....	10
5.1 General	10
5.2 Proposed Watermain.....	10
5.2.1 Overburden Excavation.....	10
5.2.2 Bedrock Excavation	11
5.2.3 Groundwater Pumping and Management.....	12
5.2.4 Pipe Bedding.....	12
5.2.5 Thrust Restraint for Watermain	13
5.2.6 Trench Backfill	14
5.2.7 Seepage Barriers	15
5.2.8 Winter Construction	15
5.2.9 Corrosion of Buried Concrete and Steel.....	15
5.3 Roadway Rehabilitation	16
5.3.1 Pavement Condition Evaluation	16
5.3.2.1 Alternative 1 - Removal and Replacement of Asphaltic Concrete	17
5.3.2.2 Alternative 2 - In situ Pulverization and Resurfacing.....	18
5.3.2.3 Alternative 3 - Full Reconstruction	19
5.3.3 Transition Treatments	21
5.3.4 Pavement Drainage	21
5.3.5 Effects of Soil Disturbance and Construction Traffic	21
5.3.6 Effects of Existing Service Trenches.....	21
5.4 Effects of Construction Induced Vibration.....	22
5.5 Design Review and Construction Observation.....	22
6.0 LIMITATION OF LIABILITY.....	23

TABLE OF CONTENTS (Continued)

In order following page 24

LIST OF FIGURES

FIGURE 1	KEY PLAN
FIGURE 2	BOREHOLE LOCATION PLAN
FIGURE 3	GRAIN SIZE ANALYSIS - ROADWAY BASE MATERIAL
FIGURE 4	GRAIN SIZE ANALYSIS - ROADWAY SUBBASE MATERIAL
FIGURE 5	GRAIN SIZE ANALYSIS – SANDY GRAVEL and CLAYEY SILT

LIST OF APPENDICES

APPENDIX A	LIST OF ABBREVIATIONS AND TERMINOLOGY RECORD OF BOREHOLE SHEETS
APPENDIX B	CHEMICAL TEST RESULTS ON GROUNDWATER SAMPLE RELATING TO CORROSION
APPENDIX C	PREVIOUS INVESTIGATION BY HOULE CHEVRIER ENGINEERING LTD. RECORD OF BOREHOLE SHEETS

1.0 INTRODUCTION

This report presents the results of a subsurface investigation carried out for the proposed watermain replacement and parking area and service road rehabilitation project at the Sussex Drive Campus of the National Research Council Canada (NRC) in the City of Ottawa, Ontario. The purpose of the investigation was to assess the pavement structure, identify the general subsurface conditions at the site by means of a limited number of boreholes and, based on the factual information obtained, to provide engineering guidelines on the geotechnical design aspects of the project, including construction considerations that could influence design decisions.

The subsurface investigation was carried out in accordance with our proposal dated July 15, 2013.

2.0 PROJECT AND SITE DESCRIPTION

2.1 Project Description

Plans are being prepared to replace the existing watermain at the Sussex Drive campus of the National Research Council Canada (NRC) in the City of Ottawa, Ontario (see Key Plan, Figure 1). It is understood that the scope of the project includes the watermain replacement and rehabilitation of the parking areas and service roads at 100 Sussex Drive.

2.2 Review of Geology Maps

Surficial geology maps of the Ottawa area indicate that the overburden deposits at the site are composed of glacial till. The overburden ranges from 1 to 10 metres thick and is underlain by interbedded limestone and shale of the Verulam Formation. Fill material associated with past development of the site should also be anticipated.

2.3 Previous Investigations by Houle Chevrier Engineering Ltd.

A previous geotechnical report was prepared by Houle Chevrier Engineering Ltd., dated March 2012, for the proposed steam line located between the NRC Boiler Plant building at 100 Sussex Drive and the Macdonald-Cartier Bridge in Ottawa, Ontario. At that time three (3) boreholes, numbered 12-1 to 12-3, inclusive, were advanced along the proposed steam line. Boreholes 12-2 and 12-3 were located in the vicinity of the parking areas and proposed watermain replacement. The record of borehole sheets for boreholes 12-2 and 12-3 are provided in Appendix C.

3.0 SUBSURFACE INVESTIGATION

The field work for this investigation was carried out on September 3, 2013. At that time, eleven (11) boreholes, numbered 13-1 to 13-11, inclusive, were advanced at the site. The boreholes were advanced to depths ranging from about 1.4 to 3.8 metres below existing ground surface using a truck mounted, hollow stem auger drill rig supplied and operated by George Downing Estate Drilling Ltd. of Grenville-sur-la-Rouge, Quebec. Boreholes 13-2, 13-5, 13-6, 13-8, 13-9 and 13-11 were advanced for the watermain replacement. The results of all the boreholes, with the exception of borehole 13-5, were used for the pavement rehabilitation.

Standard penetration tests were carried out in the boreholes, and samples of the soils encountered were recovered using a 50 millimetre diameter split barrel sampler. The subsurface conditions encountered in the upper 0.7 metres of the boreholes were identified by visual and tactile examination of the materials exposed on the sides of the boreholes. Grab samples of the soils encountered within this depth were recovered manually.

Well screens were sealed in the overburden in boreholes 13-5 and 13-11 to measure the groundwater levels. The field work was observed by a member of our engineering staff who directed the drilling operations, observed the in situ testing and logged the samples and boreholes.

Following the field work, the soil samples were returned to our laboratory for examination by a geotechnical engineer. One (1) soil sample recovered from borehole 13-11 was sent to Paracel Laboratories Ltd. for basic chemical testing relating to corrosion of buried concrete and steel. Selected samples of the soil were tested for water content and grain size distribution.

Descriptions of the subsurface conditions logged in the boreholes are provided on the Record of Borehole sheets in Appendix A. The approximate locations of the boreholes are shown on the Borehole Location Plan, Figure 2. The results of the laboratory testing are provided on Figures 3 to 5.

The borehole locations were selected by Houle Chevrier Engineering Ltd. personnel and positioned at the site relative to existing site features. The locations of the boreholes and

Report to:
Delcan Corporation

-4-

November 2013
Our ref: 13-337

ground surface elevations at the boreholes were determined using a Trimble R8 GPS survey instrument. The elevations are referenced to Geodetic datum.

4.0 SUBSURFACE CONDITIONS

4.1 General

As previously indicated, the soil and groundwater conditions identified in the boreholes are given on the Record of Borehole sheets in Appendix A. The borehole logs indicate the subsurface conditions at the specific test locations only. Boundaries between zones on the logs are often not distinct, but rather are transitional and have been interpreted. The precision with which subsurface conditions are indicated depends on the method of drilling, the frequency and recovery of samples, the method of sampling, and the uniformity of the subsurface conditions. Subsurface conditions at areas other than the test locations may vary from the conditions encountered in the boreholes. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties.

The groundwater conditions described in this report refer only to those observed at the place and time of observation noted in the report. These conditions may vary seasonally or as a consequence of construction activities in the area.

The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice. Classification and identification of soil involves judgement and Houle Chevrier Engineering Ltd. does not guarantee descriptions as exact, but infers accuracy to the extent that is common in current geotechnical practice.

The following presents an overview of the subsurface conditions encountered in the boreholes advanced during this investigation.

4.2 Previous Investigation (Boreholes 12-2 and 12-3)

As indicated above, boreholes 12-2 and 12-3 were advanced in the vicinity of the parking areas and proposed watermain replacement. The locations of these boreholes are provided on Figure 2 and the results of the boreholes are provided in Appendix C. From ground surface boreholes 12-2 and 12-3 encountered a layer of topsoil fill having a thickness of about 0.2 to 0.3 metres. The topsoil fill is underlain by fill material composed of sand, sand and gravel, silty clay, silty sand, boulders and wood fragments. Borehole 12-2 encountered possible gravel fill or weathered bedrock at a depth of about 1.8 metres below ground surface. The borehole was

terminated within this layer at about 3.1 metres below ground surface. Borehole 12-3 encountered a native deposit of grey silty clay at about 3 metres below ground surface. The borehole was terminated within this deposit at a depth of about 3.1 metres below ground surface.

4.3 Existing Pavement Structure

Asphaltic concrete was encountered from ground surface in all boreholes, with the exception of BH13-5. The asphaltic concrete ranges in thickness from about 60 to 170 millimetres and is underlain by roadway base material.

At boreholes 13-2, 13-10 and 13-11, the asphaltic concrete is underlain by roadway base and subbase materials. The base material is composed of grey and brown sand and gravel and has a thickness of about 70 to 280 millimetres. The subbase material is composed of brown, grey and dark grey, fine to coarse grained sand and gravel and ranges in thickness from about 100 to 360 millimetres.

At boreholes 13-1, 13-3, 13-4, and 13-6 to 13-9, there was no obvious distinction between the base and subbase materials. At these locations the base/subbase is composed of grey sand and gravel having a thickness of between 260 and 620 millimetres.

The results of grain size distribution testing on samples of the base material recovered from boreholes 13-2 and 13-10 and the base/subbase material from borehole 13-4 are provided on Figure 3 along with the grain size distribution envelope for Ontario Provincial Standard Specification (OPSS) Granular A. The samples do not meet the gradation requirements for OPSS Granular A due to excess amounts of silt size particles in boreholes 13-2 and 13-4 (12 and 15 percent versus the maximum of 8 percent in the OPSS requirement) and an excess amount of gravel in BH 13-10. Moisture content testing carried out on samples of the roadway base material and the base/subbase material from borehole 13-4 indicate moisture contents around 3 percent.

The results of grain size distribution testing on samples of the subbase material recovered from boreholes 13-2 and 13-10 are provided on Figure 4 along with the grain size distribution envelope for OPSS Granular B Type II. The sample from borehole 13-2 does not meet the

gradation requirements for OPSS Granular B Type II due to an excess amount of silt size particles (16 percent versus the maximum of 8 percent in the OPSS requirement). The sample from borehole 13-10 meets the gradation requirements for OPSS Granular B Type II. Moisture content testing carried out on samples of the roadway subbase material indicate moisture contents ranging from about 3 to 6 percent.

4.4 Topsoil Fill

Borehole 13-5 encountered topsoil fill from ground surface. The topsoil fill is composed of dark brown sand with some silt and organic material and has a thickness of about 130 millimetres.

4.5 Fill Material

Fill material was encountered beneath the roadway structure and topsoil in all boreholes. The fill material is variable in nature and can generally be described as sand/sand and gravel with varying amounts of silt and clay as well as silty clay/clayey silt with varying amounts of sand and gravel. The fill material has a thickness of about 0.5 to 1.4 metres and extends to a depth of about 1.3 to 2.7 metres below ground surface (elevation 55.6 to 54.1 metres, geodetic datum), respectively. Cobbles were observed within the fill material.

Standard penetration tests carried out in the fill material gave N values ranging from 8 to 31 blows per 0.3 metres of penetration, which reflect a variable, loose to dense relative density.

Boreholes 13-3, 13-7 and 13-10 were terminated within the layer of fill at depths of about 1.5 metres below ground surface (elevation 55.1 to 55.2 metres, geodetic datum).

4.6 Possible Fill Material

Possible fill material was encountered beneath the roadway structure or topsoil in boreholes 13-5, 13-6 and 13-8. Fill material is difficult to distinguish from the native soils, being of a similar composition, and is often only identifiable by the presence of erroneous material (e.g. brick fragments, asphaltic concrete pieces, etc.). Since it could not be confirmed if the material is fill material (i.e., we did not encounter erroneous material), the material was labeled as 'possible fill'.

The possible fill material is variable in nature and can generally be described as brown, dark brown and grey sand, sandy gravel and sand and gravel. The possible fill material has a thickness ranging from about 0.4 to 2.1 metres and extends to a depth of about 0.8 to 2.7 metres below ground surface (elevation 54.1 to 55.4 metres, geodetic datum). The water content of samples of the possible fill material ranges from about 4 to 10 percent.

The results of a grain size distribution test on a sample of the sandy gravel from borehole 13-5 are provided on Figure 5. The testing indicates that the sample contains about 56 percent gravel, 23 percent sand, 13 percent silt and 8 percent clay size particles.

4.7 Sand and Gravel

A deposit of sand and gravel was encountered beneath the fill in borehole 13-9.

A standard penetration test carried out in this deposit gave an N value of about 90 blows per 0.3 metres of penetration, which reflects a very dense relative density.

4.8 Clayey Silt

A layer of clayey silt was encountered in borehole 13-11 at a depth of about 2.1 metres. The clayey silt has a thickness of 0.6 metres and extends to a depth of about 2.8 metres below ground surface (elevation 54.1 metres, geodetic datum).

One standard penetration test carried out in the clayey silt gave an N value of 4 blows per 0.3 metres of penetration indicating a stiff to very stiff consistency.

The results of a grain size distribution test on a sample of the clayey silt from borehole 13-11 are provided on Figure 5. The testing indicates that the sample contains about 14 percent sand, 58 percent silt and 28 percent clay size particles.

4.9 Bedrock

Possible weathered bedrock was encountered below the fill material in boreholes 13-2, 13-6 and 13-8, below the sand and gravel in borehole 13-9 and below the clayey silt in borehole 13-11.

Standard penetration tests carried out in the possible weathered bedrock at boreholes 13-6, 13-8 and 13-11 gave N values of 60 blows per 0.2 metres and 50 blows per 0.1 metres of penetration.

Auger refusal on inferred bedrock was encountered in boreholes 13-1, 13-2, 13-4, 13-5, 13-6, 13-8, 13-9 and 13-11 at depths ranging from 1.4 to 3.8 (elevation 53.1 to 55.4 metres, geodetic datum).

It should be noted that the bedrock depth encountered in the boreholes may reflect past excavation activities.

4.10 Groundwater Levels

The well screens installed in boreholes 13-5 and 13-11 were dry on September 13, 2013.

The groundwater levels may be higher during wet periods of the year such as the early spring or following periods of precipitation.

4.11 Groundwater Chemistry Relating to Corrosion

The results of chemical testing of a soil sample from borehole 13-11 is provided in Appendix B and summarized in the following table:

Parameter	Level
Chloride Content ($\mu\text{g/g}$)	976
Resistivity (Ohm.metre)	5.15
pH	7.96
Sulphate Content ($\mu\text{g/g}$)	158

The results of the chemical testing are discussed in Section 5.2.9.

5.0 DESIGN GUIDELINES

5.1 General

The information in the following sections is provided for the guidance of the design engineers and is intended for the design of this project only. Contractors bidding on or undertaking the works should examine the factual results of the investigation, satisfy themselves as to the adequacy of the information for construction, and make their own interpretation of the factual data as it affects their construction techniques, schedule, safety and equipment capabilities.

The professional services retained for this project include only the geotechnical aspects of the subsurface conditions. The implications of possible surface and/or subsurface contamination resulting from previous uses or activities of this site or adjacent properties, and/or resulting from the introduction onto the site from materials from offsite sources are outside the terms of reference for this report and have not been addressed.

5.2 Proposed Watermain

5.2.1 Overburden Excavation

The excavation for the watermain construction will be carried out through asphaltic concrete, roadway granular material, topsoil, fill material and sand and gravel.

In the overburden, the excavation for flexible service pipes should be in accordance with Ontario Provincial Standard Drawing (OPSD) 802.010 for Type 3 Soil. The excavation for rigid service pipes should be in accordance with OPSD 802.031 for Type 3 soil.

Fill material can be random in nature and may contain cobbles and boulders. The contractor should be made aware of the requirement to remove boulder size material as part of the excavation works. Some of the boulders may have to be wasted from the excavation.

The sides of the excavations within overburden soils should be sloped in accordance with the requirements in Ontario Regulation 213/91 under the Occupational Health and Safety Act. According to the Act, most of the soils at this site can be classified as Type 3 soils. Therefore, for design purposes, allowance should be made for 1 horizontal to 1 vertical, or flatter, excavation

slopes. As an alternative or where space constraints dictate, the service installation could be carried out within a tightly fitting, braced steel trench box, which is specifically designed for this purpose.

The well screens installed in boreholes 13-5 and 13-11 were dry on September 13, 2013. The proposed invert level of the pipe is expected to be about 2.5 to 3.0 metres below ground surface. No unusual constraints are expected in excavating the fill and sand and gravel deposits above the groundwater level.

5.2.2 Bedrock Excavation

In bedrock, the excavation for flexible service pipes should be in accordance with Ontario Provincial Standard Drawing (OPSD) 802.013 for bedrock. The excavation for rigid service pipes should be in accordance with OPSD 802.033 for bedrock.

Based on our experience in the vicinity of the site, localized bedrock removal at this site could be carried out using hoe ramming techniques in conjunction with line drilling on close centres. Provided that good bedrock excavation techniques are used, the bedrock could be excavated using vertical side walls. Any loose rock should be scaled from the sides of the excavation.

Significant effort may be required to break the bedrock with a hoe ram, particularly if a thick bed and/or hard bedrock is encountered. In order to reduce over break and/or under break of the bedrock in areas where the excavation will be carried out next to an existing site service or structure, it is suggested that the limit of excavation be defined by line drilling on close centers. For the bedrock at this site, it is suggested that allowance be made for line drilling 75 to 100 millimetre diameter holes on 200 to 300 millimetre centres.

The vibration effects of hoe ramming are usually significantly lower and more localized than those associated with blasting; however, there may be equipment in the building that is sensitive to vibration. Therefore, we recommend that a threshold vibration limit be established in advance of construction based on the specific uses in the building. If the client indicates that the building uses are not sensitive to vibration, a threshold limit of 50 millimetres per second could be used. Lower threshold values may be required for any freshly placed concrete. Monitoring of the hoe ramming could be carried out to measure the vibrations to ensure that

they are below the acceptable threshold values. Pre-construction condition surveys of nearby structures and existing buried services are recommended so that any post-construction claims can be handled in a fair manner.

5.2.3 Groundwater Pumping and Management

No groundwater was observed in the well screens in boreholes 13-5 and 13-11 on September 13, 2013. Groundwater inflow from the overburden deposits and bedrock, if any, should be controlled by pumping from filtered sumps within the excavation. It is not expected that short term pumping during excavation will have a significant effect on nearby structures and services.

Based on the groundwater measurements to date, and assuming there is no increase in the groundwater level and that the maximum depth of excavation is about 3.0 metres, the rate of groundwater inflow into the excavations should not exceed 50,000 litres per day. As such, a Permit to Take Water (PTTW) is likely not required for this project. A PTTW could be obtained as a precautionary measure in the event that the construction proceeds during a wet period of the year when the groundwater levels may be higher.

Suitable detention and filtration will be required before discharging the water to any sewers. The contractor should be required to prepare and submit an excavation and groundwater management plan for review and approval as part of the contract.

5.2.4 Pipe Bedding

The bedding for the new watermain should be in accordance with OPSD 802.010 and OPSD 802.013 for flexible pipes in earth excavation and bedrock excavation, respectively, and OPSD 802.031 and OPSD 802.033 for rigid pipes in earth excavation and bedrock excavation, respectively. The pipe bedding material should consist of at least 150 millimetres of well graded crushed stone meeting OPSS for Granular A. OPSS documents allow recycled asphaltic concrete and concrete to be used in Granular A material. Since the source of recycled material cannot be determined, it is suggested that any granular materials used in the service trench be composed of virgin (i.e., not recycled) material only.

In areas where unsuitable material (such as existing fill material) exists below the pipe subgrade level, or where the subgrade becomes disturbed (for example due to groundwater inflow), the unsuitable/disturbed material should be removed and replaced with a subbedding layer of compacted granular material, such as that meeting OPSS Granular B Type II (50 or 100 millimetre minus crushed stone). To provide adequate support for the pipes in the long term in areas where subexcavation of material is required below design subgrade level, the excavations should be sized to allow a 1 horizontal to 2 vertical spread of granular material down and out from the bottom of the pipe. The use of clear crushed stone as bedding or subbedding material should not be permitted.

Cover material, from pipe spring line to at least 300 millimetres above the top of the pipe, should consist of granular material, such as OPSS Granular A.

The subbedding, bedding and cover materials should be compacted in maximum 200 millimetre thick lifts to at least 95 percent of the standard Proctor dry density value.

5.2.5 Thrust Restraint for Watermain

Based on the results of the boreholes, the subsurface at the depth of the proposed watermain will likely consist of trench backfill, sand and gravel or limestone bedrock. In areas where the subgrade for the thrust block is disturbed or where unsuitable material (such as existing fill material) exists below the pipe subgrade level, the disturbed/unsuitable material should be removed and replaced with a layer of compacted granular material, such as that meeting OPSS Granular B Type II. The Granular B Type II material should be compacted in maximum 200 millimetre thick lifts to at least 95 percent of the standard Proctor dry density value. The following parameters could be used for design purposes:

Coefficient of friction between granular backfill and smooth PVC pipe:	0.25
Bearing pressure for thrust blocks bearing on native deposits of sand and gravel	100 kilopascals
Bearing pressure for thrust blocks bearing on a pad of compacted granular material above native overburden deposits or bedrock	100 kilopascals

Bearing pressure for thrust blocks bearing on sound bedrock

500 kilopascals

The above allowable bearing pressures for the thrust blocks assume that they are vertical and bear on or within the native deposits, or on a pad of compacted granular material above the native deposits or bedrock, or on sound bedrock.

5.2.6 Trench Backfill

To reduce the potential for differential frost heaving between the area over the trench and the adjacent parking area, acceptable native materials should be used as backfill between the parking area subgrade level and the depth of seasonal frost penetration (i.e., 1.8 metres below finished grade). Where these cover requirements are not practicable, the pipe could be protected from frost using a combination of earth cover and insulation. Further details regarding insulation could be provided, if required. The backfill materials within the zone of frost penetration should match the materials exposed on the trench walls. Backfill below the zone of seasonal frost penetration could consist of either acceptable native material or imported granular material conforming to OPSS Granular B Type II.

To minimize future settlement of the backfill and achieve an acceptable subgrade for the roadways, parking areas, curbs, etc., the trench backfill should be compacted in maximum 300 millimetre thick lifts to at least 95 percent of the standard Proctor dry density value. In landscaped areas, the overburden backfill could be compacted to at least 90 percent of the standard Proctor dry density value, provided that some settlement of the finished ground surface is acceptable.

The fill materials are sensitive to changes in moisture content and precipitation. Depending on the weather conditions encountered during the construction, the specified densities may not be possible to achieve, and, as a consequence, some settlement of these backfill materials could occur. Consideration could be given to implementing one or a combination of the following measures to reduce post construction settlement above the trench, depending on the weather conditions encountered during the construction:

- Allow the overburden materials to dry prior to compaction;
- Reuse any wet materials in the lower part of the trench and make provision to defer final

paving of surface course (i.e., the Superpave 12.5 asphaltic concrete) above the trench for 3 months, or longer, to allow the trench backfill settlement to occur and thereby improve the final roadway/parking lot appearance.

5.2.7 Seepage Barriers

Based on the groundwater levels observed in the well screens, along with the subsurface conditions encountered in the boreholes, seepage barriers are not required along the watermain trench if the proposed excavation depths do not exceed 3.0 metres. If the proposed excavation depths for the watermain exceed 3.0 metres, further analysis and recommendations can be provided upon request.

5.2.8 Winter Construction

In order to carry out the work during freezing temperatures and maintain adequate performance of the trench backfill as a roadway subgrade, the service trench should be opened for as short a time as practicable and the excavations should be carried out only in lengths which allow all of the construction operations, including backfilling, to be fully completed in one working day. The materials on the sides of the trench should not be allowed to freeze. In addition, the backfill should be excavated, stored and replaced without being disturbed by frost or contaminated by snow or ice.

5.2.9 Corrosion of Buried Concrete and Steel

The measured sulphate concentration in a sample of the clayey silt was 158 micrograms per gram. According to Canadian Standards Association (CSA) "Concrete Materials and Methods of Concrete Construction", the concentration of soluble sulphate in the soil is in the low range. Therefore, any concrete in contact with the soil in this area could be batched with General Use (GU) cement. The effects of freeze thaw in the presence of de-icing chemical (sodium chloride) use on the roadway should be considered in selecting the air entrainment and the concrete mix proportions for any concrete.

Based on the resistivity and pH of the sample, the soil in this area can be classified as aggressive towards unprotected steel. It is noted that the corrosivity of the soil/groundwater could vary throughout the year due to the application sodium chloride for de-icing.

5.3 Roadway Rehabilitation

5.3.1 Pavement Condition Evaluation

It is understood that consideration is being given to rehabilitating the parking areas and service roads at this site. The condition of the access roadways and parking areas were evaluated as part of our investigation. The following summarizes our condition evaluation of the existing asphaltic concrete:

West Access Road

- Moderate coarse aggregate loss (raveling) was observed throughout; and
- Slight to severe longitudinal centerline cracking was observed throughout.

Corridor Adjacent to North Side of Building

- Moderate coarse aggregate loss (raveling) was observed throughout;
- Slight to severe longitudinal and transverse single and multiple cracks were observed on an intermittent to frequent basis; and
- Slight to moderate transverse and longitudinal alligator cracking was observed intermittently;

North Parking Area

- Moderate coarse aggregate loss (raveling) was observed throughout;
- Moderate to severe longitudinal cracks were observed throughout, likely along construction joints;
- Slight to severe longitudinal and transverse single and multiple cracks were observed on an intermittent to frequent basis; and
- Slight to very severe transverse and longitudinal alligator cracking was observed intermittently;

East Parking Area

- Moderate coarse aggregate loss (raveling) was observed throughout;
- Slight to severe longitudinal and transverse single and multiple cracks were observed intermittently. The longitudinal cracks are likely associated with construction joints;

- Slight to very severe transverse alligator cracking was observed intermittently;

East Access Road

- Moderate coarse aggregate loss (raveling) was observed throughout; and
- Slight to moderate longitudinal and transverse cracks were observed intermittently;

It should be noted that the majority of the cracks observed in the access roadways and parking areas had been sealed; however, some isolated re-opening of these cracks was observed.

Surface water drainage at the site is provided by catch basins and storm sewers.

5.3.2 Pavement Rehabilitation Alternatives

Typical pavement rehabilitation alternatives include: pavement overlay, removal and replacement of asphaltic concrete, in situ pulverization and full reconstruction. In our opinion, a pavement overlay at this site would result in reflective cracking due to the existing cracks in the asphaltic concrete within about 2 years. Therefore, we have only provided our comments on removal and replacement (Alternative 1), in-situ pulverization (Alternative 2) and full reconstruction (Alternative 3). It is noted that the existing subbase and base materials do not meet OPSS requirements for Granular B Type I and Granular A due to the percentage of silt size particles, which may affect the performance of the roadway (for removal and replacement and in situ pulverization rehabilitation alternatives). The rehabilitation alternatives provided are considered appropriate for both heavy vehicle access routes and car and light truck parking areas, although it should be noted that the sections below provide separate suggested pavement structures for these uses.

Rehabilitation is not considered essential for the newly rebuilt section of access roadway on the east side of the building.

5.3.2.1 Alternative 1 - Removal and Replacement of Asphaltic Concrete

Consideration could be given to removing the existing asphaltic concrete and resurfacing with new asphaltic concrete. For the access roadways and the corridor on the north side of the building (which may be used by heavy vehicles, including fire trucks), the asphaltic concrete surfacing thickness should be at least 90 millimetres (40 millimetres of Superpave 12.5, over 50

millimetres of Superpave 19.0, Traffic Level B). In the parking areas that are used by cars only, the asphaltic concrete thickness should be at least 50 millimetres (Superpave 12.5, Traffic Level B). Alternatively, 90 millimetres of asphaltic concrete could be used throughout to improve performance and more closely match the thickness of the existing asphaltic concrete.

Following the removal of the existing asphaltic concrete, the surface of the existing base material should be regraded and compacted to at least 98 percent of the standard Proctor dry density value. A leveling layer composed of OPSS Granular A should be placed, where required, and should be compacted in maximum 200 millimetre thick lifts and compacted to at least 98 percent of the standard Proctor dry density value.

The design life of this alternative is expected to be about 5 to 8 years. With the replacement of the asphaltic concrete, reflective cracking will be mitigated. However, allowance should be made for periodic crack sealing to reduce deterioration of the pavement due to the ingress of water.

5.3.2.2 Alternative 2 - In situ Pulverization and Resurfacing

The existing asphaltic concrete could be pulverized and mixed with the underlying granular materials, and the mixed and pulverized material topped with a thin (levelling) layer of OPSS Granular A and new asphaltic concrete. Compared with removal and replacement of the asphaltic concrete, pulverization and mixing improves the performance of the existing granular materials by blending material with the existing base and eliminates the need for off site disposal of the asphaltic concrete. Based on the thickness of the existing asphaltic concrete at the borehole locations, conventional pulverization equipment should be suitable. Assuming that pulverization and mixing is carried out to a depth of about 200 millimetres, the blended material should contain about 50 percent by volume of bituminous material, which is considered acceptable. Milling in advance of pulverization will be required where the asphaltic concrete exceeds about 110 millimetres (for example, borehole 13-10).

Following pulverization, regrading should be carried out, where required. Allowance should be made to place a thin layer of OPSS Granular A prior to placing the new asphaltic concrete surfacing.

In the parking areas the pulverized mixture and leveling layer of OPSS Granular A could be topped with at least 50 millimetres of hot mix asphaltic concrete (Superpave 12.5 millimetre, Traffic Level B). For the access roadways and the corridor on the north side of the building, the pulverized mixture and leveling layer could be topped with 40 millimetres of Superpave 12.5, over 50 millimetres of Superpave 19.0 (Traffic Level B). It should be noted that removal of some of the pulverized material may be required to maintain an acceptable curb height. However, in our experience, it is usually possible to reduce the amount of removal required by leveling out the pulverized mixture to low portions of the parking lot or roadway and by increasing the crown of the parking lot/roadway surface.

All imported granular and pulverized materials should be placed in maximum 200 millimetre thick lifts and should be compacted to at least 98 percent of the standard Proctor dry density value using suitable vibratory compaction equipment.

The design life of the pulverized alternative is expected to be about 8 to 12 years. With in situ pulverization, reflective cracking will be mitigated. Notwithstanding, allowance should be made for periodic crack sealing to reduce the pavement deterioration due to the ingress of water.

5.3.2.3 Alternative 3 - Full Reconstruction

In preparation for full reconstruction, the existing asphaltic concrete and granular materials should be removed to the design pavement depth. The subgrade surface should then be proof rolled with a large steel drum roller. Any soft areas evident from the proof rolling and any organic or otherwise deleterious materials should be subexcavated and replaced with suitable earth borrow material. This need not include the removal of the existing fill material. In areas where abrupt changes in the frost susceptibility of the subgrade materials are encountered, frost tapers and/or some subexcavation of materials may be required to prevent future localized differential frost heaving of the pavement structure. The frost taper and subexcavation requirements should be assessed at the time of construction by geotechnical personnel.

For full reconstruction, the following minimum pavement structure could be considered for the parking areas:

50 millimetres of hot mix asphaltic concrete (Superpave 12.5, Traffic Level B), over
150 millimetres of OPSS Granular A, over
300 millimetres of OPSS Granular B Type II (50 or 100 millimetre minus crushed stone).

For the access roadways and the corridor on the north side of the building, the thickness of the asphaltic concrete should be increased to 90 millimetres (40 millimetres of Superpave 12.5, over 50 millimetres of Superpave 19.0, Traffic Level B), and the OPSS Granular B Type II thickness should be increased to 400 millimetres.

Performance Grade PG 58-34 should be specified for the asphaltic concrete at this site.

The above pavement structure assumes that the subgrade surface is prepared as described in this report. If the subgrade surface is disturbed or wetted due to construction operations or precipitation, the granular thicknesses given above may not be adequate and it may be necessary to increase the thickness of the Granular B Type II subbase and/or to incorporate a woven geotextile separator between the subgrade surface and the granular subbase material.

The adequacy of the design pavement thickness should be assessed by geotechnical personnel at the time of construction.

To avoid cracking of the asphaltic concrete due to an abrupt change in the thickness of the roadway granular materials where the new pavement structure joins with an existing pavement, the granular depths should taper up or down at 5 horizontal to 1 vertical to match the existing pavement structure.

All imported granular materials should be placed in maximum 200 millimetre thick lifts and should be compacted to at least 98 percent of the standard Proctor dry density value using suitable vibratory compaction equipment.

The design life for a reconstructed pavement is about 20 years, with resurfacing in about 12 to 15 years.

5.3.3 Transition Treatments

In areas where the rehabilitated pavement structure will abut existing pavements, the depths of the granular materials should taper up or down at 5 horizontal to 1 vertical, or flatter, to match the depths of the granular material(s) exposed in the existing pavement.

5.3.4 Pavement Drainage

If possible, it is suggested that filter wrapped, perforated subdrains be installed at the catch basins in the access roadways and parking areas. The catch basins should be provided with 3 metre (minimum) long perforated stub drains which extend in at least two directions from the catch basin at the pavement subgrade level.

5.3.5 Effects of Soil Disturbance and Construction Traffic

The guidelines above for the trench reinstatement and parking area rehabilitation assume that the trench backfill is adequately compacted, and prepared as described in this report. If the subgrade surface above the watermain becomes disturbed or wetted due to construction operations or precipitation, the Granular B Type II thickness given above may not be adequate and it may be necessary to increase the thickness of the Granular B Type II subbase and/or to incorporate a woven geotextile separator between the roadway subgrade surface and the granular subbase material. The adequacy of the design pavement thickness should be assessed by geotechnical personnel at the time of construction.

If the granular pavement materials above the trenches are to be used by construction traffic, it may be necessary to increase the thickness of the Granular B Type II, install a woven geotextile separator between the subgrade surface and the granular material, or a combination, to prevent pumping and disturbance to the subbase material. The contractor should be made responsible for their construction access.

5.3.6 Effects of Existing Service Trenches

Differential frost heaving could occur in areas where abrupt changes in the frost susceptibility of the subgrade materials exist. The locations of any service trenches that cause differential frost heaving issues during the winter period should be identified at the design stage. To mitigate

future differential frost heaving at these locations, granular frost tapers (sloped at 5 horizontal to 1 vertical, or flatter) and/or some subexcavation of materials could be carried out as part of the rehabilitation. The frost heave treatment could be assessed at the time of the construction by geotechnical personnel.

5.4 Effects of Construction Induced Vibration

Some of the construction operations (such as granular material compaction, excavation, etc.) will cause ground vibration on and off of the site. The vibrations will attenuate with distance from the source, but may be felt at nearby structures. There may be equipment in the building that is sensitive to vibration. Therefore, we recommend that a threshold vibration limit be established in advance of construction based on the specific uses in the building.

We recommend that preconstruction surveys be carried out on the adjacent structures and that vibration monitoring be carried out during the construction so that any damage claims can be addressed in a fair manner.

5.5 Design Review and Construction Observation

The details for the proposed construction were not available to us at the time of preparation of this report. It is recommended that the final design drawings be reviewed by the geotechnical engineer to ensure that the guidelines provided in this report have been interpreted as intended. The engagement of the services of the geotechnical consultant during construction is recommended to confirm that the subsurface conditions throughout the proposed excavations do not materially differ from those given in the report and that the construction activities do not adversely affect the intent of the design. The subgrade surfaces for the watermain and parking area should be inspected by experienced geotechnical personnel to ensure that suitable materials have been reached and properly prepared. The placing and compaction of earth fill and imported granular materials should be inspected to ensure that the materials used conform to the grading and compaction specifications.

6.0 LIMITATION OF LIABILITY

This report was prepared for Delcan Corporation and the National Research Council Canada and the work referred to within it has been undertaken by Houle Chevrier Engineering Ltd. (HCEL). It is intended for the exclusive use of Delcan Corporation and the National Research Council Canada. This report may not be relied upon by any other person or entity without the express written consent of HCEL, Delcan Corporation and the National Research Council Canada. Nothing in this report is intended to provide a legal opinion.

The investigation undertaken by HCEL with respect to this report and any conclusions or recommendations made in this report reflect the best judgements of HCEL based on the site conditions observed during the investigations undertaken at the date(s) identified in the report and on the information available at the time the report was prepared. This report has been prepared for the application noted and it is based, in part, on visual observations made at the site, subsurface investigations at discrete locations and depths and laboratory analyses of material during a specific time interval, all as described in the report. Unless otherwise stated, the findings contained in this report cannot be extrapolated or extended to previous or future site conditions, portions of the site that were unavailable for direct investigation, subsurface locations on the site that were not investigated directly, or chemical parameters, materials or analysis which were not addressed.

Should new information become available during future work, including excavations, borings or other studies, HCEL should be requested to review the information and, if necessary, re-assess the conclusions presented herein.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

Yours truly,

HOULE CHEVRIER ENGINEERING LTD.



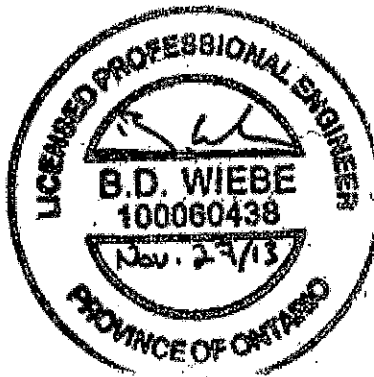
Lauren Ashe, B.Sc., E.I.T.

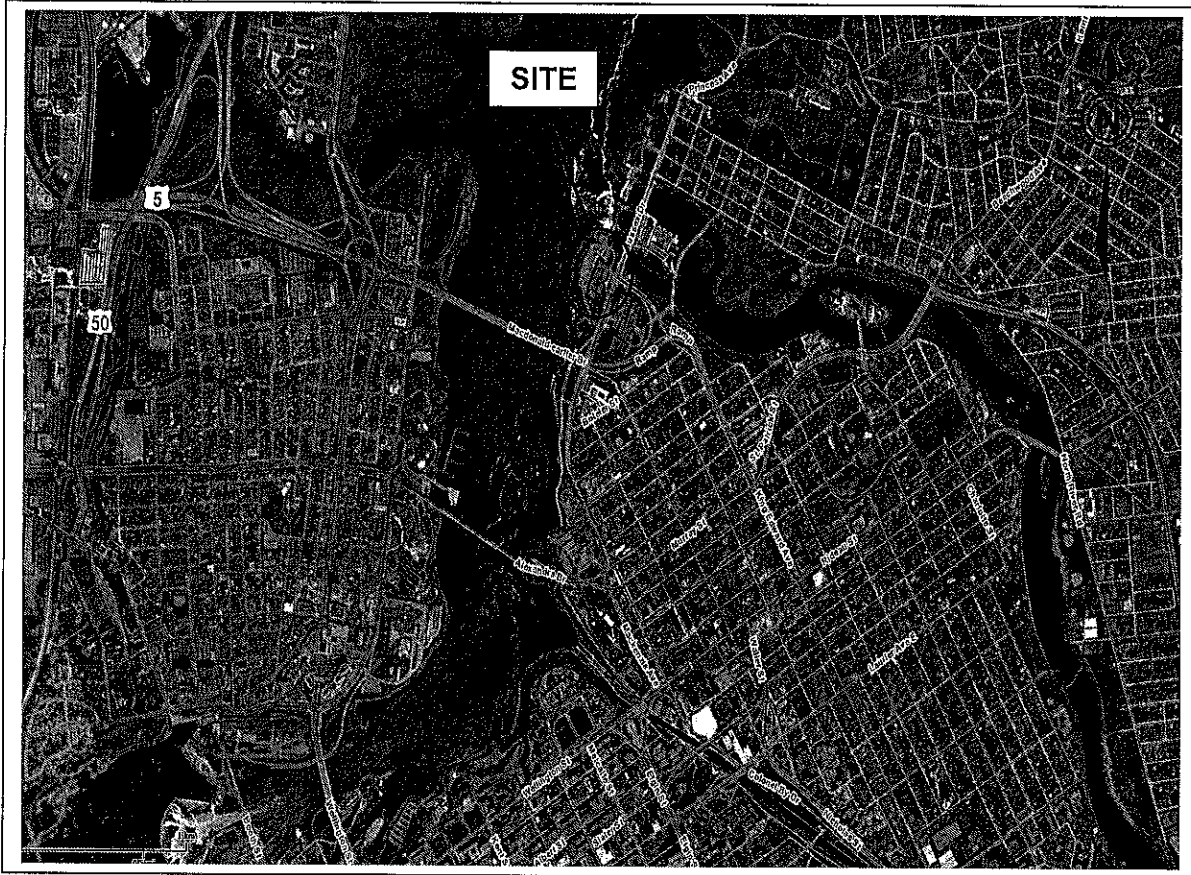


Brent Wiebe, P.Eng.

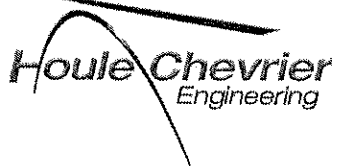


Andrew Chevrier, M.Eng., P.Eng.
Principal



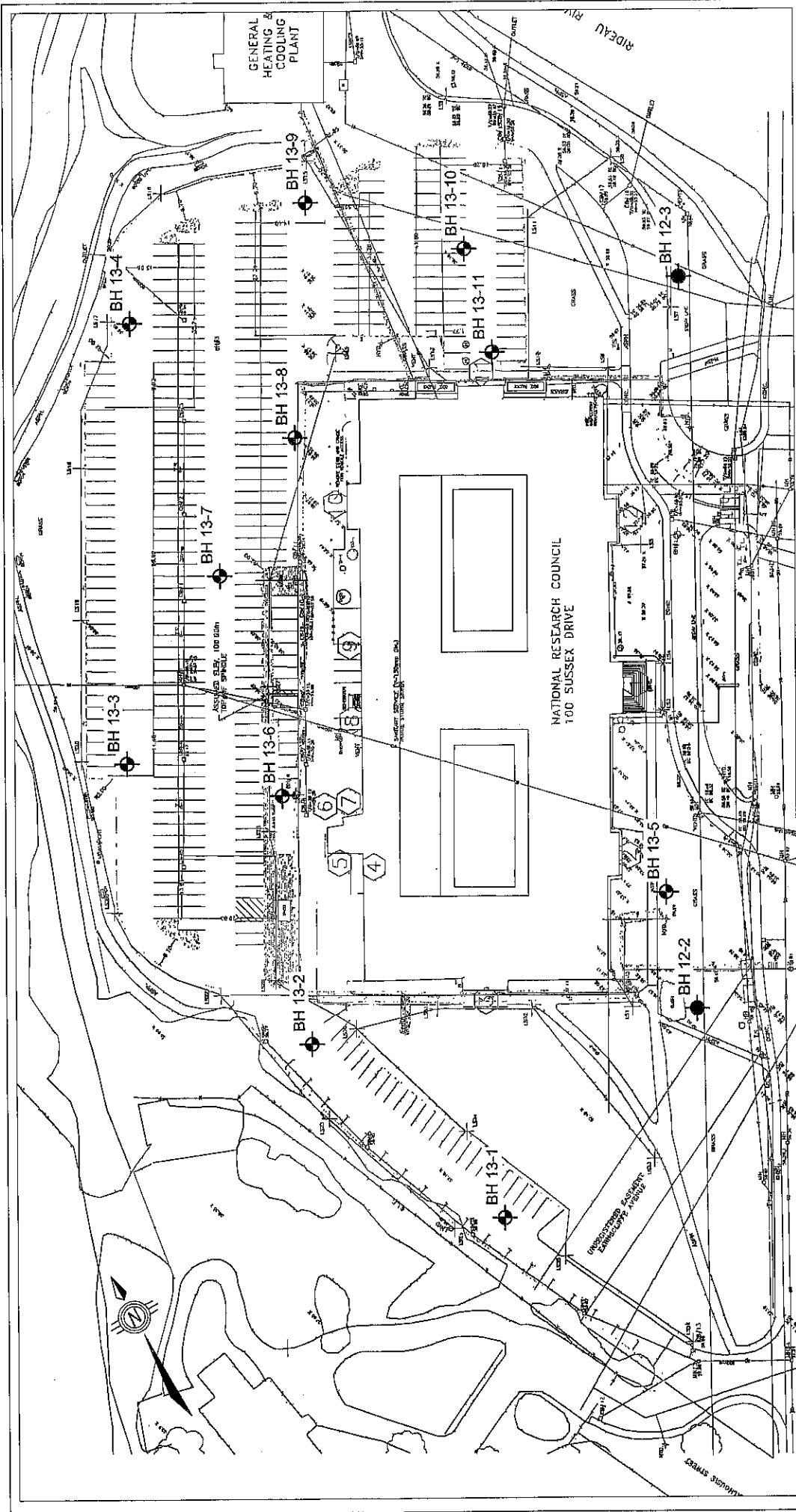


N.T.S





Date: November 2013

Project: 13-337

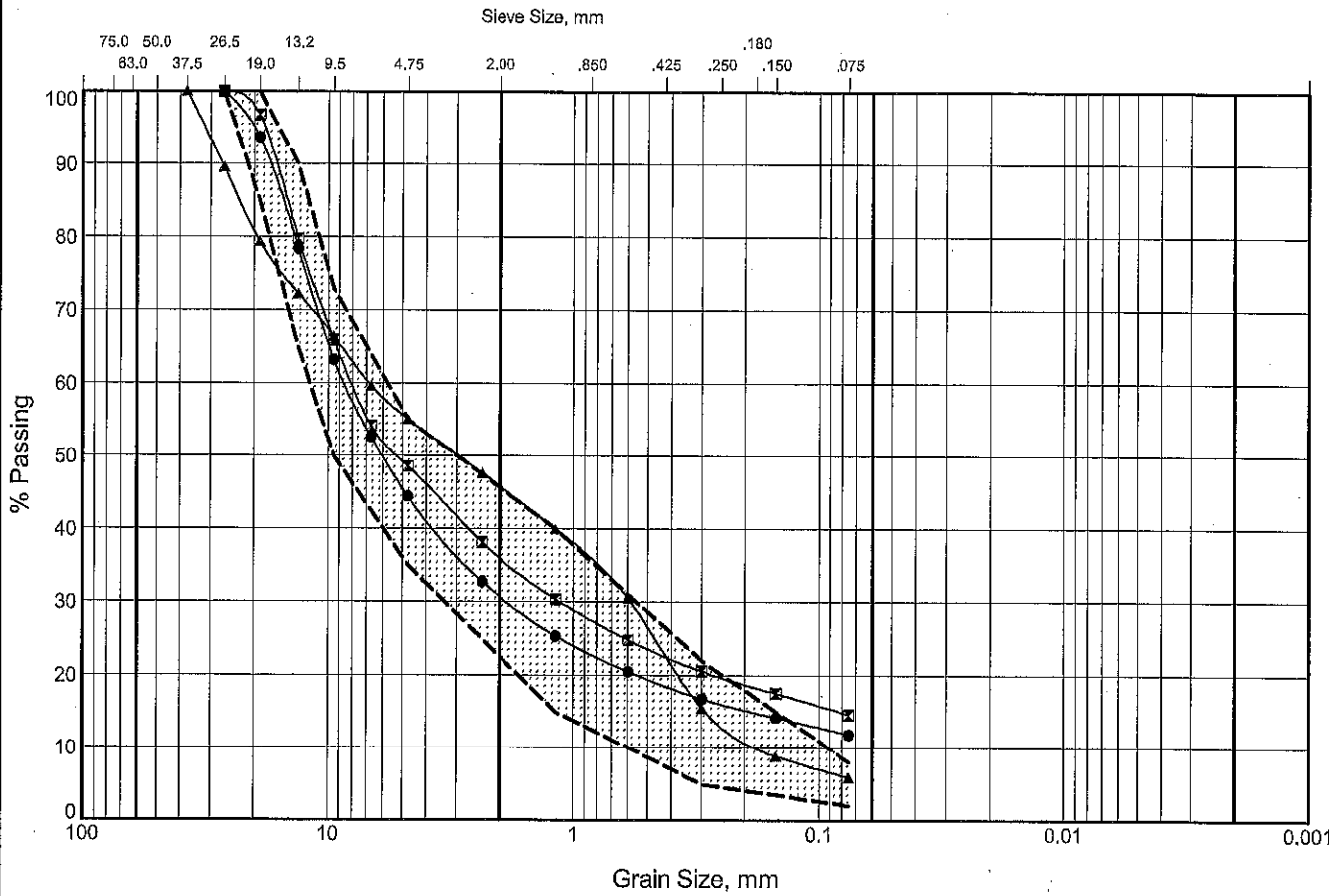


Client	DELCAN CORPORATION	Location	100 SUSSEX DRIVE OTTAWA, ONTARIO	Revision	0
Drawn by	A.N.	Approved by	B.W.	Project No.	13-337
Title			BOREHOLE LOCATION PLAN		
Date			NOVEMBER 2013		
Scale			N.T.S.		
Logo					
Figure			FIGURE 2		

- LEGEND**
-  BH 13-1 APPROXIMATE BOREHOLE LOCATION IN PLAN, CURRENT INVESTIGATION BY HOULE CHEVRIER ENGINEERING LTD.
 -  BH 12-2 APPROXIMATE BOREHOLE LOCATION IN PLAN, PREVIOUS INVESTIGATION BY HOULE CHEVRIER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

FIGURE 3



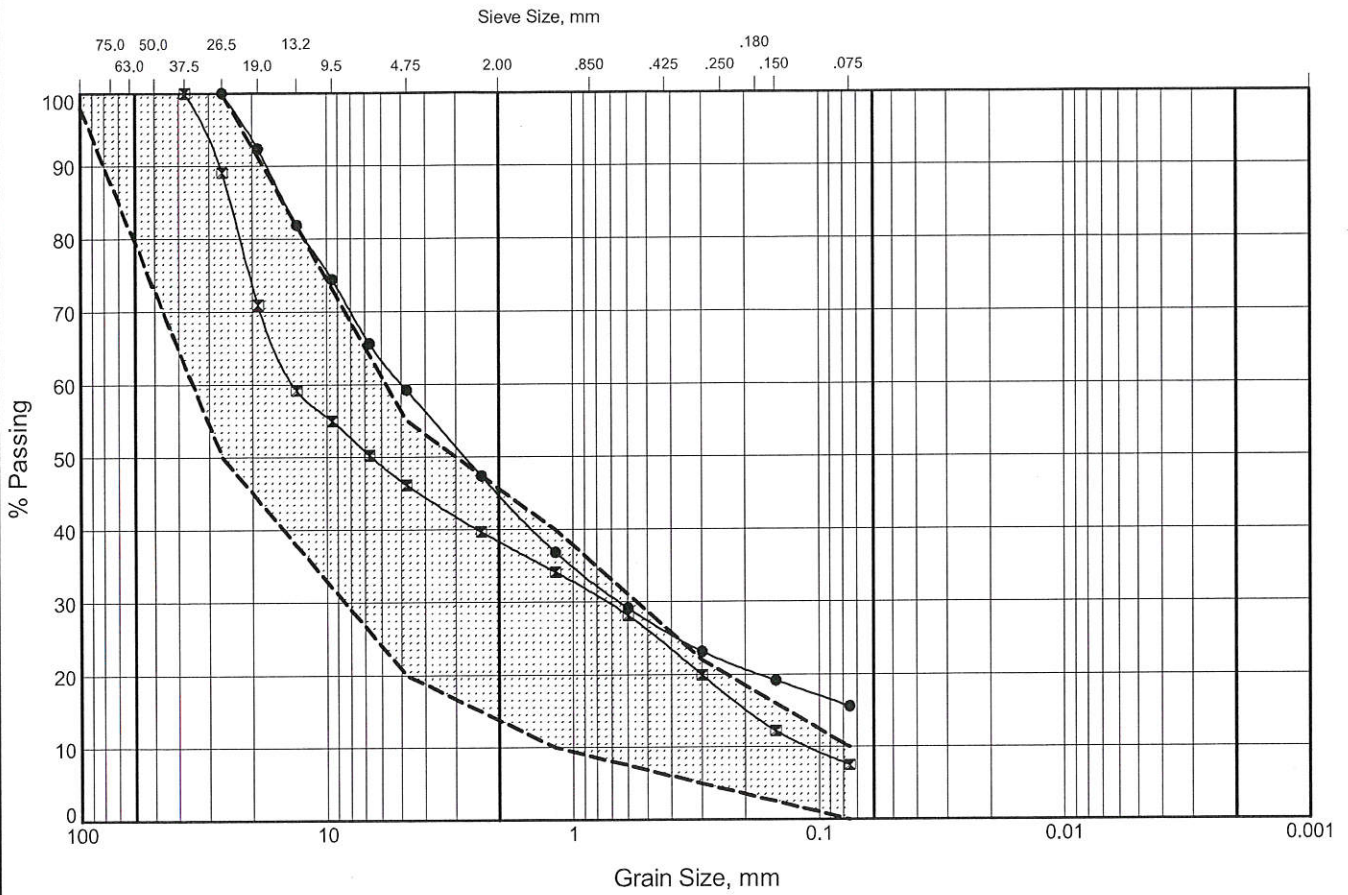
GRAVEL		SAND			SILT			CLAY	
COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	CLAY
Modified M.I.T. Classification									

Borehole	Sample	Depth (m)	Legend
13-2	1	0.1 - 0.4	●
13-4	1	0.1 - 0.4	⊠
13-10	1	0.2 - 0.4	▲

--- Gradation Envelope: OPSS 1010 - GRANULAR A

GRAIN SIZE DISTRIBUTION

FIGURE 4



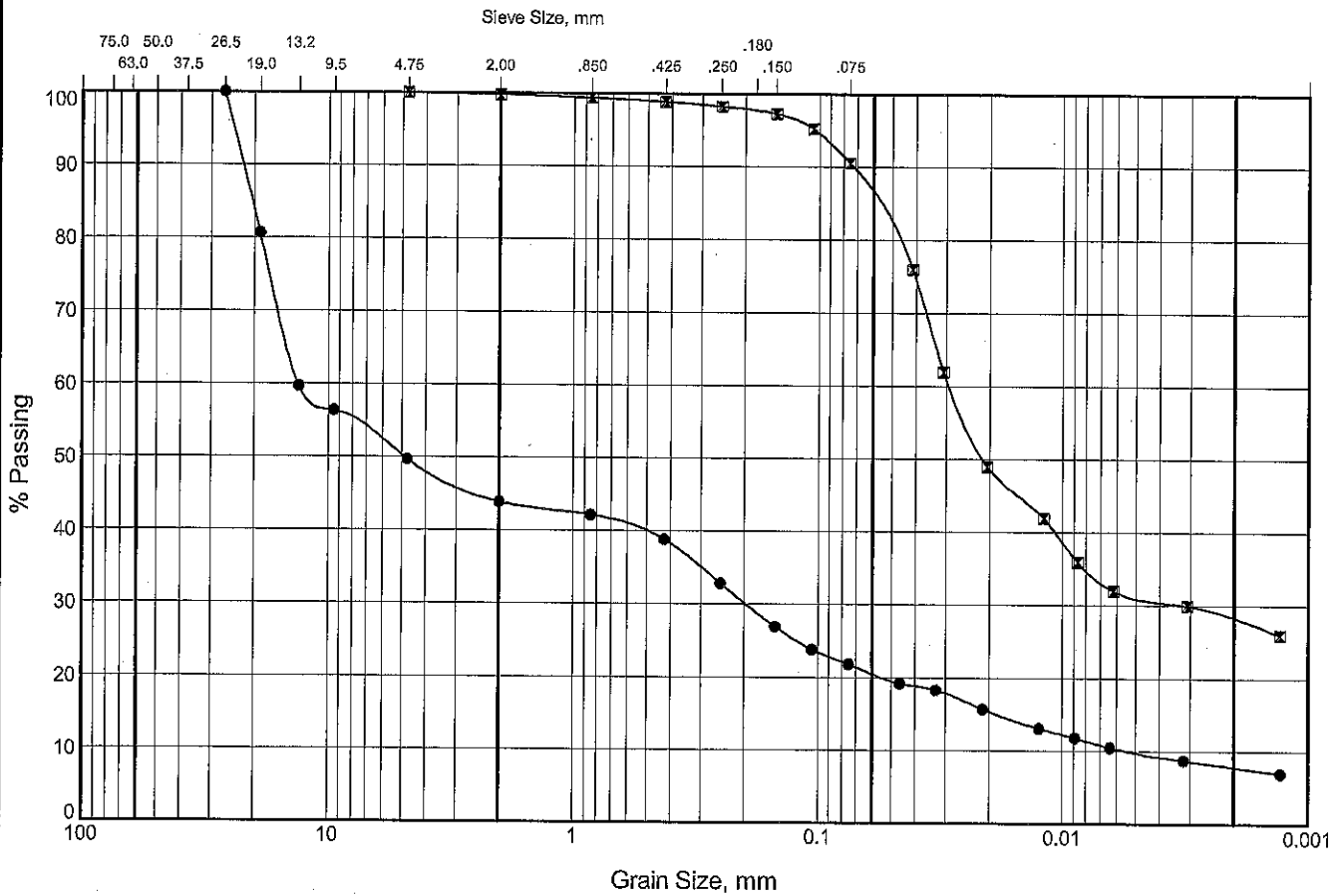
COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	CLAY
GRAVEL			SAND			SILT			
Modified M.I.T. Classification									

Borehole	Sample	Depth (m)	Legend
13-2	2	0.4 - 0.7	●
13-10	2	0.4 - 0.6	⊠

----- Gradation Envelope: OPSS 1010 - GRANULAR B TYPE II

GRAIN SIZE DISTRIBUTION

FIGURE 5



COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	COARSE	MEDIUM	FINE	CLAY
GRAVEL			SAND			SILT			
Modified M.I.T. Classification									

Borehole	Sample	Depth (m)	Legend
13-5	3	1.5 - 2.0	●
13-11	6	2.3 - 2.7	☒

SOILS GRAIN SIZE GRAPH GINT LOGS SEPTEMBER 3 2013.GPJ HOULE CHEVRIER FEB 9 2011.GDT 11/27/13



Date: November 2013

Project: 13-337

November 2013

Our ref: 13-337

APPENDIX A

LIST OF ABBREVIATIONS AND TERMINOLOGY
RECORD OF BOREHOLE SHEETS

LIST OF ABBREVIATIONS AND TERMINOLOGY

SAMPLE TYPES

AS	auger sample
CS	chunk sample
DO	drive open
MS	manual sample
RC	rock core
ST	slotted tube
TO	thin-walled open Shelby tube
TP	thin-walled piston Shelby tube
WS	wash sample

PENETRATION RESISTANCE

Standard Penetration Resistance, N

The number of blows by a 63.5 kg hammer dropped 760 millimetres required to drive a 50 mm drive open sampler for a distance of 300 mm. For split spoon samples where less than 300 mm of penetration was achieved, the number of blows is reported over the sampler penetration in mm.

Dynamic Penetration Resistance

The number of blows by a 63.5 kg hammer dropped 760 mm to drive a 50 mm diameter, 60° cone attached to 'A' size drill rods for a distance of 300 mm.

WH

Sampler advanced by static weight of hammer and drill rods.

WR

Sampler advanced by static weight of drill rods.

PH

Sampler advanced by hydraulic pressure from drill rig.

PM

Sampler advanced by manual pressure.

SOIL TESTS

C	consolidation test
H	hydrometer analysis
M	sieve analysis
MH	sieve and hydrometer analysis
U	unconfined compression test
Q	undrained triaxial test
V	field vane, undisturbed and remoulded shear strength

SOIL DESCRIPTIONS

<u>Relative Density</u>	<u>'N' Value</u>
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

<u>Consistency</u>	<u>Undrained Shear Strength (kPa)</u>
--------------------	---------------------------------------

Very soft	0 to 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very Stiff	over 100

LIST OF COMMON SYMBOLS

c_u	undrained shear strength
e	void ratio
C_c	compression index
c_v	coefficient of consolidation
k	coefficient of permeability
I_p	plasticity index
n	porosity
u	pore pressure
w	moisture content
w_L	liquid limit
w_p	plastic limit
ϕ^1	effective angle of friction
γ	unit weight of soil
γ^1	unit weight of submerged soil
σ	normal stress

PROJECT: 13-337

RECORD OF BOREHOLE 13-1


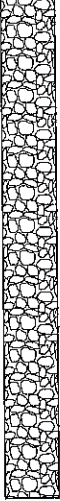
SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m		HYDRAULIC CONDUCTIVITY, k, cm/s		ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT, PERCENT	
								nat. V - + Cu, kPa	rem. V - ⊕ U - ○			Wp	Wl
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		56.88							Cold Patch  Native Backfill  No groundwater observed on completion of borehole		
		ASPHALTIC CONCRETE		56.78 0.10									
		Grey sand and gravel, trace to some silt (BASE / SUBBASE MATERIAL)			1	CS							
		Dark grey silty clay, some sand, some gravel (FILL MATERIAL)			56.16 0.72	2	CS						
1		Brown sand and gravel, trace silt, trace clay (FILL MATERIAL)			55.79 1.09	3	50 D.O.	22					
	Auger refusal on inferred bedrock End of borehole			55.41 1.47									

BOREHOLE RECORD WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE
1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.
CHECKED:

PROJECT: 13-337

RECORD OF BOREHOLE 13-2

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT, PERCENT					
								Cu, kPa		nat. V - + Q - ● rem. V - ⊕ U - ○		Wp		W			WI
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		56.91													
		ASPHALTIC CONCRETE		56.81													Cold Patch
		Grey fine to coarse grained sand and gravel, some silt (BASE MATERIAL)		0.10	1	CS											
		Grey fine to coarse grained sand and gravel, some silt (SUBBASE MATERIAL)		0.38	2	CS											
		Brown sand and gravel, some silt (FILL MATERIAL)		0.74	3	CS											
1					4	50 D.O.	31										Native Backfill
		Possible WEATHERED BEDROCK		1.27													
		Auger refusal on inferred bedrock End of borehole		1.55												No groundwater observed on completion of borehole	

BOREHOLE RECORD WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE

1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.

CHECKED:

PROJECT: 13-337

RECORD OF BOREHOLE 13-3



SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT, PERCENT					
								Cu, kPa		nat. V - + Q - ● rem. V - ⊕ U - ○		Wp				W	
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		56.67											Cold Patch 		
		ASPHALTIC CONCRETE		56.61													
		Grey sand and gravel, trace silt (BASE / SUBBASE MATERIAL)		0.06		1	CS										
		Brown sand and gravel, some silt, trace clay, cobbles observed (FILL MATERIAL)		56.25 0.42		2	CS										
1		Dark grey silty clay, some gravel, trace sand (FILL MATERIAL)		55.98 0.69		3		50	16	D.O.					Native Backfill 		
	End of borehole		55.15 1.52											No groundwater observed on completion of borehole			
2																	
3																	
4																	

BOREHOLE RECORD WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE

1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.

CHECKED:

PROJECT: 13-337

RECORD OF BOREHOLE 13-4

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT, PERCENT					
								Cu, kPa		rem. V - ⊕		Wp		WI			
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		56.51													
		ASPHALTIC CONCRETE		56.41													Cold Patch
		Grey sand and gravel, some silt (BASE / SUBBASE MATERIAL)		56.10	1	CS											
		Brown sand and gravel, some silt, cobbles observed (FILL MATERIAL)		58.09	2	CS											
		Grey silty clay, some sand, trace gravel, trace roots and organic material (FILL MATERIAL)		55.81													
1				55.70													
				55.09	3	50 D.O.	10									Native Backfill	
		Auger refusal on inferred bedrock		55.09												No groundwater observed on completion of borehole	
		End of borehole		1.42													

BOREHOLE RECORD WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE
1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.
CHECKED:

PROJECT: 13-337

RECORD OF BOREHOLE 13-5

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		nat. V - + Q - ●		rem. V - ⊕ U - ○		WATER CONTENT, PERCENT			
								20	40	60	80	20	40	60			80
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		57.12												Flush Mount Bentonite Filter Sand 51mm diameter, 0.91m long slotted PVC pipe MH Monitoring well dry on September 13, 2013	
		Dark brown, fine to medium grained sand, some silt, trace gravel, trace organic material (TOPSOIL FILL)		56.99 0.13	1	50 D.O.	9										
		Brown, fine to medium grained sand, some silt, trace gravel, occasional silty clay pocket (Possible FILL MATERIAL)				2	50 D.O.	11									
1		Dark brown sandy gravel, some silt, trace clay (Possible FILL MATERIAL)		55.60 1.52	3	50 D.O.	90 for 6.20m										
2		Auger refusal on inferred bedrock End of borehole		54.94 2.18													
3																	
4																	

BOREHOLE RECORD WITH LAB WC - GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE
1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.
CHECKED:

PROJECT: 13-337

RECORD OF BOREHOLE 13-6

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH		WATER CONTENT, PERCENT					
								Cu, kPa	rem. V - ⊕	Wp	WI				
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		56.25											
		ASPHALTIC CONCRETE		56.15											Cold Patch
		Grey sand and gravel, trace silt (BASE / SUBBASE MATERIAL)		0.10	1	CS									
		Brown sand and gravel, some silt, trace clay (Possible FILL MATERIAL)		55.79 0.46	2	CS									
		Possible WEATHERED BEDROCK		55.44 0.81	3	50 D.O. for 0.20m									
1		Auger refusal on inferred bedrock End of borehole		54.67 1.58											No groundwater observed on completion of borehole
2															
3															
4															

BOREHOLE RECORD WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE

1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.

CHECKED:

PROJECT: 13-337

RECORD OF BOREHOLE 13-7

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

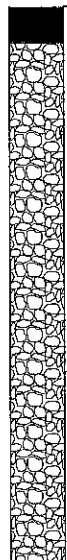
DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH		WATER CONTENT, PERCENT					
								Cu, kPa	nat. V - + rem. V - ⊕	Q - ● U - ○	Wp	W	Wl		
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		56.57											
		ASPHALTIC CONCRETE		56.47											
		Grey sand and gravel, trace silt (BASE / SUBBASE MATERIAL)		0.10	1	CS									
		Brown, fine to medium grained sand, some gravel, trace silt, cobbles observed (FILL MATERIAL)		0.36	2	CS									
		Brown sand and gravel, some silt, trace clay (FILL MATERIAL)		0.56	3	CS									
1				56.01											
				0.56	4	50 D.O.	10								
		End of borehole		55.05											
				1.52											
2															
3															
4															

BOREHOLE RECORD WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ FCE DATA TEMPLATE.GDT 10/23/13



PROJECT: 13-337

RECORD OF BOREHOLE 13-8

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	20	40	60	80	10 ⁻⁷	10 ⁻⁶			10 ⁻⁵
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		58.77												
		ASPHALTIC CONCRETE		56.86												Cold Patch
		Grey sand and gravel, some silt (BASE / SUBBASE MATERIAL)		56.11	1	CS										
		Brown, fine to medium grained sand, trace silt, trace clay (FILL MATERIAL)		56.21												
				56.07	2	CS										
1			Brown to grey sand and gravel, trace to some silt, trace clay (Possible FILL MATERIAL)		56.07											
				0.70												
				55.25	3	50 D.O.	23									Native Backfill
		Brown, fine to medium grained sand, some gravel, trace silt (Possible FILL MATERIAL)		55.25												
			1.62													
2				4	50 D.O.	13										
				5	50 D.O.	31										
				54.10												
			2.67													
3		Possible WEATHERED BEDROCK														
				53.62												
			3.15													
		Auger refusal on inferred bedrock End of borehole			6	50 D.O.	50 for 0.0m								No groundwater observed on completion of borehole	

BOREHOLE RECORD WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE

1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.

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PROJECT: 13-337

RECORD OF BOREHOLE 13-9

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT, PERCENT						
								Cu, kPa		rem. V - U		Wp		Wi				
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		56.72												Cold Patch		
		ASPHALTIC CONCRETE		56.61														
		Grey sand and gravel, some silt (BASE / SUBBASE MATERIAL)		0.11	1	CS												
		Brown sand and gravel, trace silt (FILL MATERIAL)		0.56	2	CS												
1					3		50	18										Native Backfill
					4		50	9										
			Brown clayey silt, some sand and gravel (FILL MATERIAL)		1.85													
			Grey brown SAND and GRAVEL, some silt		1.98													
		Possible WEATHERED BEDROCK		2.57														
2				5		50	90									No groundwater observed on completion of borehole		
				0.26m														
		Auger refusal on inferred bedrock End of borehole		2.85														
3																		
4																		

BOREHOLE RECORDED WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE

1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.

CHECKED:

PROJECT: 13-337

RECORD OF BOREHOLE 13-10

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION				
		DESCRIPTION	STRATA PILOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH Cu, kPa		nat. V - + Q - ●		rem. V - ⊕ U - ○				WATER CONTENT, PERCENT			
								20	40	60	80	20	40			60	80	Wp	W
0	Power Auger 200 mm Diameter Hollow Stem	Ground Surface		56.59															
		ASPHALTIC CONCRETE																	
			Brown, fine to coarse grained sand and gravel, trace silt (BASE MATERIAL)		56.42 0.17	1	CS												
			Dark grey sand and gravel, trace silt (SUBBASE MATERIAL)		56.20 0.39	2	CS												
			Dark grey brown clayey silt, some sand and gravel (Possible FILL MATERIAL)		55.99 0.60	3	CS												
1					4	50 D.O.	8												
		End of borehole		55.07 1.52															

Cold Patch

M

M

Native Backfill

No groundwater observed on completion of borehole

BOREHOLE RECORD WITH LAB WC GINT LOGS SEPTEMBER 3 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE

1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.

CHECKED:

PROJECT: 13-337

RECORD OF BOREHOLE 13-11

SHEET 1 OF 1

LOCATION: See Borehole Location Plan Figure 2

DATUM: Geodetic

BORING DATE: September 3, 2013

SPT HAMMER: 63.5 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION		
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT, PERCENT					
								20 40 60 80		nat. V - + Q - ●		rem. V - ⊕ U - ○				Wp	
0		Ground Surface		56.84											Flush Mount		
		ASPHALTIC CONCRETE		56.78													
		Grey sand and gravel, trace silt (BASE MATERIAL)		56.89	1	CS											
		Brown, fine to coarse grained sand, trace to some silt, some gravel, cobbles (SUBBASE MATERIAL)		56.89	2	CS											
		Grey brown sand and gravel, trace silt, trace clay (FILL MATERIAL)		56.59													
				0.25													
		Brown, fine to medium grained SAND, trace silt (FILL MATERIAL)		56.23											Bentonite		
				0.61													
		Grey brown silty clay, some sand, some gravel (FILL MATERIAL)		55.96													
				0.88													
1		Brown sand and gravel, trace silt, cobbles observed (FILL MATERIAL)		55.81	4	50 D.O.	9								Filter Sand		
				1.03													
		no sample recovery		55.32													
				1.52													
2	Power Auger 200 mm Diameter Hollow Stem	Brown CLAYEY SILT, some sand		54.71	5	50 D.O.	15								61mm diameter, 1.22m long slotted PVC pipe		
				2.13													
				54.07	6	50 D.O.	4								MH, Corrosion		
				2.77													
3		Possible WEATHERED BEDROCK		53.05	7	50 D.O.	50 for 0.10m								Bentonite		
				3.79													
4		Auger refusal on inferred bedrock End of borehole													Monitoring well dry on September 13, 2013		

BOREHOLE RECORD WITH LAB W/C GINT LOGS SEPTEMBER 3, 2013.GPJ HCE DATA TEMPLATE.GDT 10/23/13

DEPTH SCALE

1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.

CHECKED:

November 2013

Our ref: 13-337

APPENDIX B

CHEMICAL TEST RESULTS ON GROUNDWATER
SAMPLE RELATING TO CORROSION
PARACEL LABORATORIES LTD.

Certificate of Analysis

Houle Chevrier

180 Wescar Lane
Carp, ON K0A 1L0
Attn: Brent Wiebe

Phone: (613) 836-1422
Fax: (613) 836-9731

Client PO:
Project: 13-337
Custody:

Report Date: 23-Sep-2013
Order Date: 18-Sep-2013

Order #: 1338206

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

Paracel ID
1338206-01

Client ID
BH 13-11 - SA 6

Approved By:



Mark Foto, M.Sc. For Dale Robertson, BSc
Laboratory Director

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 circumstances be liable to you in connection with this work

Certificate of Analysis

Client: Houle Chevrier
Client PO:

Project Description: 13-337

Report Date: 23-Sep-2013
Order Date: 18-Sep-2013

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Anions	EPA 300.1 - IC, water extraction	19-Sep-13	19-Sep-13
pH	EPA 150.1 - pH probe @ 25 °C, CaCl buffered ext.	18-Sep-13	19-Sep-13
Resistivity	EPA 120.1 - probe, water extraction	23-Sep-13	23-Sep-13
Solids, %	Gravimetric, calculation	19-Sep-13	19-Sep-13

P: 1-800-749-1947
E: PARACEL@PARACELLABS.COM

WWW.PARACELLABS.COM

OTTAWA
300-2319 St. Laurent Blvd.
Ottawa, ON K1G 4J8

MISSISSAUGA
8946 Klimat Rd, Unit 927
Mississauga, ON L5N 6J3

NIAGARA FALLS
5416 Morning Glory Ct.
Niagara Falls, ON L2J 0A3

SARNIA
123 Christine St. N.
Sarnia, ON N7T 5T7

Certificate of Analysis

Report Date: 23-Sep-2013

Order Date: 18-Sep-2013

Client: Houle Chevrier

Project Description: 13-337

Client PO:

Client ID:	BH 13-11 - SA 6	-	-	-
Sample Date:	03-Sep-13	-	-	-
Sample ID:	1338206-01	-	-	-
MDL/Units	Soil	-	-	-

Physical Characteristics

% Solids	0.1 % by Wt.	83.5	-	-	-
----------	--------------	------	---	---	---

General Inorganics

pH	0.05 pH Units	7.96	-	-	-
Resistivity	0.10 Ohm.m	5.15	-	-	-

Anions

Chloride	5 ug/g dry	976	-	-	-
Sulphate	5 ug/g dry	158	-	-	-

Certificate of Analysis

Client: Houle Chevrier
Client PO:

Project Description: 13-337

Report Date: 23-Sep-2013
Order Date: 18-Sep-2013

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	5	ug/g						
Sulphate	ND	5	ug/g						
General Inorganics									
Resistivity	ND	0.10	Ohm.m						

Certificate of Analysis

Report Date: 23-Sep-2013
Order Date: 18-Sep-2013

Client: Houle Chevrier

Project Description: 13-337

Client PO:

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	40.2	5	ug/g dry	41.5			3.2	20	
Sulphate	29.1	5	ug/g dry	28.3			2.9	20	
General Inorganics									
pH	7.88	0.05	pH Units	7.96			1.0	10	
Resistivity	5.09	0.10	Ohm.m	5.15			1.1	20	
Physical Characteristics									
% Solids	83.7	0.1	% by Wt.	80.3			4.2	25	

Certificate of Analysis

Client: Houle Chevrier
Client PO:

Project Description: 13-337

Report Date: 23-Sep-2013
Order Date: 18-Sep-2013

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	13.6		mg/L	4.1	94.8	78-113			
Sulphate	13.5		mg/L	2.83	107	78-111			

Certificate of Analysis

Report Date: 23-Sep-2013
Order Date: 18-Sep-2013

Client: Houle Chevrier
Client PO:

Project Description: 13-337

Qualifier Notes:

None

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

- n/a: not applicable
- ND: Not Detected
- MDL: Method Detection Limit
- Source Result: Data used as source for matrix and duplicate samples
- %REC: Percent recovery.
- RPD: Relative percent difference.

Soil results are reported on a dry weight basis when the units are denoted with 'dry'.
Where %Solids is reported, moisture loss includes the loss of volatile hydrocarbons.

November 2013

Our ref: 13-337

APPENDIX C
PREVIOUS INVESTIGATION
BY HOULE CHEVRIER ENGINEERING LTD.
RECORD OF BOREHOLE SHEETS

PROJECT: 12-032

RECORD OF BOREHOLE 12-2

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: February 27, 2012

SPT HAMMER: 21.17 kg; drop 0.76 m

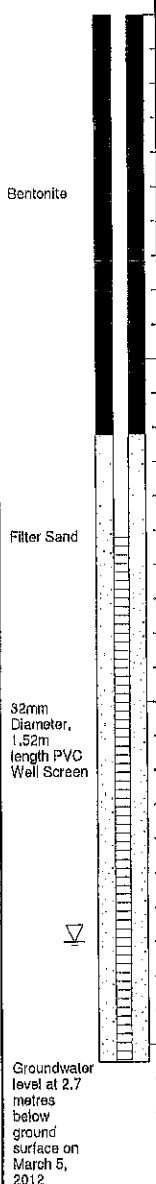
DEPTH SCALE METRES	BORING METHOD	ROCK PROFILE		SAMPLES			DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, k, cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	SHEAR STRENGTH				WATER CONTENT, PERCENT					
								20 40 60 80		nat. V - + Q - ● rem. V - ⊕ U - ○		10 ⁻⁷ 10 ⁻⁶ 10 ⁻⁵ 10 ⁻⁴		Wp W Wl 20 40 60 80			
0		Ground Surface		56.93													
		Dark brown sand, some silt, some organic material (TOPSOIL / FILL)															
				56.62 0.31	1	50 DO	5								Bentonite		
		Brown, fine to coarse grained sand, trace silt and gravel (FILL)															
					2	50 DO	5										
1				55.86 1.07													
		Gray brown silty clay, some gravel (POSSIBLE FILL)															
	Split Spoon 50mm Diameter				3	50 DO	5								Filter Sand		
				55.10 1.83													
		Poor sample recovery Possible gravel fill or weathered/fractured limestone bedrock															
					4	50 DO	7										
2																	
					5	50 DO	23										
				55.89 3.05													
3		End of Borehole															
4																	

ROCK LOGS 2012 12-032 LOGS.GPJ HGE DATA TEMPLATE.GDT 28/3/12

DEPTH SCALE
1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.
CHECKED:



PROJECT: 12-092

RECORD OF BOREHOLE 12-3

SHEET 1 OF 1

LOCATION: See Borehole Location Plan, Figure 2

DATUM: Geodetic

BORING DATE: February 27, 2012

SPT HAMMER: 21.17 kg; drop 0.76 m

DEPTH SCALE METRES	BORING METHOD	ROCK PROFILE		SAMPLES		DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m				HYDRAULIC CONDUCTIVITY, K_v cm/s				ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION	
		DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	SHEAR STRENGTH				WATER CONTENT, PERCENT					
							20		40		60		80			20
0		Ground Surface		56.89												
	Spill Spoon 50mm Diameter	Dark brown silty sand, some organic material (TOPSOIL / FILL)		56.69												
		Grey brown to brown sand and gravel, trace silt (FILL)		0.20												
	Rotary Diamond 75.88mm Diameter	Boulders (FILL)		56.20	1	50 DO	28	10	23m						Bentonite	
1		Grey brown clayey sand and gravel, some silt (FILL)		1.22	2	RC										
	Spill Spoon 50mm Diameter	Brown silty sand, some gravel and clay (FILL)		54.78	4	50 DO	12								Filter Sand	
		Possible peat with wood (FILL)		2.24												
		Brown, fine to coarse grained sand, some gravel, silt, clay and trace wood fragments (FILL)		2.34	5	50 DO	8									
2		Grey SILTY CLAY		3.05												
3		End of Borehole		53.89												
4				53.84												
				3.05											Groundwater level at 2.4 metres below ground surface on March 5, 2012	

ROCK LOGS 2012 12-092 LOGS.GPJ HCE DATA TEMPLATE.GDT 28/3/12

DEPTH SCALE

1 to 20

Houle Chevrier Engineering Ltd.

LOGGED: A.N.

CHECKED:

Photographs showing the collapsed storm sewer at the steam tunnel crossing along the west side entrance near Sussex Drive.



Blocked Pipe Looking North



Blocked Pipe Looking North – Zoom



Blocked Pipe Looking South Toward Sussex



Blocked Pipe Looking South Toward Sussex - Zoomed



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 obligation 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.



Article	Page	Titre
CG1	1	Interpretation
CG2	2	Sucesseurs et ayants droit
CG3	2	Cession du Contrat
CG4	2	Sous-traitance par l'Entrepreneur
CG5	2	Modifications
CG6	3	Nulle obligation implicite
CG7	3	Caractère essentiel des délais et échéances
CG8	3	Indemnisation par l'Entrepreneur
CG9	3	Indemnisation par Sa Majesté
CG10	3	Interdiction aux députés de la Chambre des communes de tirer profit d'un contrat
CG11	4	Avis
CG12	4	Matériaux, outillage et biens immobiliers fournis par Sa Majesté
CG13	5	Matériaux, outillage et biens immobiliers devenus propriété de Sa Majesté
CG14	5	Permis et taxes payables
CG15	6	Exécution des travaux sous la direction du représentant ministériel
CG16	6	Coopération avec d'autres Entrepreneurs
CG17	7	Vérification des travaux
CG18	7	Déblaiement de l'emplacement
CG19	8	Surintendant de l'Entrepreneur
CG20	8	Sécurité nationale
CG21	8	Ouvriers inaptes
CG22	9	Augmentation ou diminution des coûts
CG23	9	Main-d'œuvre et matériaux canadiens
CG24	10	Protection des travaux et des documents
CG25	10	Cérémonies publiques et enseignes
CG26	10	Précautions contre les dommages, la transgression des droits, les incendies, et les autres dangers
CG27	11	Assurances
CG28	11	Indemnité d'assurance
CG29	12	Garantie du contrat
CG30	13	Modifications aux travaux
CG31	13	Interprétation du Contrat par le représentant ministériel
CG32	14	Garantie et rectification des défauts des travaux
CG33	15	Défaut de l'Entrepreneur
CG34	15	Protestations des décisions du représentant ministériel
CG35	15	Changement des conditions du sol – Négligence ou retard de la part de Sa Majesté
CG36	16	Prolongation de délai
CG37	17	Dédommagement pour retard d'exécution
CG38	17	Travaux retirés à l'Entrepreneur
CG39	18	Effet du retrait des travaux à l'Entrepreneur
CG40	19	Suspension des travaux par le Ministre
CG41	19	Résiliation du Contrat
CG42	20	Réclamations contre et obligations de la part de l'Entrepreneur ou d'un sous-entrepreneur
CG43	22	Dépôt de garantie – Confiscation ou remise
CG44	22	Certificats du représentant ministériel
CG45	24	Remise du dépôt de garantie
CG46	24	Précision du sens des expressions figurant aux articles CG47 à CG50
CG47	24	Additions ou modifications au Tableau des prix unitaires
CG48	25	Établissement du coût – Tableau des prix unitaires
CG49	25	Établissement du coût – Négociation
CG50	26	Établissement du coût en cas d'échec des négociations
CG51	27	Registres à tenir par l'Entrepreneur
CG52	27	Conflits d'intérêts
CG 53	28	Situation de l'Entrepreneur

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 rebus, 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 rebus 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 rebus et débris.

18.4 Les obligations qu'imposent à l'Entrepreneur les paragraphes CG18.1 à CG18.3 ne s'appliquent pas aux rebus 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'Entrepreneur 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 vert 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 tout 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'autre 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 néglige 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'Entreteneur 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 à 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
Security Classification / Classification de sécurité

**SECURITY REQUIREMENTS CHECK LIST (SRCL)
LISTE DE VÉRIFICATION DES EXIGENCES RELATIVES À LA SÉCURITÉ (LVERS)**

PART A - CONTRACT INFORMATION / PARTIE A - INFORMATION CONTRACTUELLE

1. Originating Government Department or Organization / Ministère ou organisme gouvernemental d'origine	National Research Council	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

Work under this contract covers the watermain replacement, repairs to storm sewers, parking lot reconstruction and interception and treatment of the sanitary discharge located at the National Research Council, 100 Sussex Drive, Ottawa, Ontario.

5. a) Will the supplier require access to Controlled Goods? / Le fournisseur aura-t-il accès à des marchandises contrôlées? No / Non Yes / Oui

5. b) Will the supplier require access to unclassified military technical data subject to the provisions of the Technical Data Control Regulations? / Le fournisseur aura-t-il accès à des données techniques militaires non classifiées qui sont assujetties aux dispositions du Règlement sur le contrôle des données techniques? No / Non Yes / Oui

6. Indicate the type of access required / Indiquer le type d'accès requis

6. a) Will the supplier and its employees require access to PROTECTED and/or CLASSIFIED information or assets? / Le fournisseur ainsi que les employés auront-ils accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS? (Specify the level of access using the chart in Question 7. c) / Préciser le niveau d'accès en utilisant le tableau qui se trouve à la question 7. c) No / Non Yes / Oui

6. b) Will the supplier and its employees (e.g. cleaners, maintenance personnel) require access to restricted access areas? No access to PROTECTED and/or CLASSIFIED information or assets is permitted. / Le fournisseur et ses employés (p. ex. nettoyeurs, personnel d'entretien) auront-ils accès à des zones d'accès restreintes? L'accès à des renseignements ou à des biens PROTÉGÉS et/ou CLASSIFIÉS n'est pas autorisé. No / Non Yes / Oui

6. c) Is this a commercial courier or delivery requirement with no overnight storage? / S'agit-il d'un contrat de messagerie ou de livraison commerciale sans entreposage de nuit? No / Non Yes / Oui

7. a) Indicate the type of information that the supplier will be required to access / Indiquer le type d'information auquel le fournisseur devra avoir accès

Canada <input checked="" type="checkbox"/>	NATO / OTAN <input type="checkbox"/>	Foreign / Étranger <input type="checkbox"/>
--------------------------------------------	--------------------------------------	---------------------------------------------

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: Specify country(ies): / Préciser le(s) pays: <input type="checkbox"/>	Restricted to: / Limité à: Specify country(ies): / Préciser le(s) pays: <input type="checkbox"/>	Restricted to: / Limité à: Specify country(ies): / Préciser le(s) pays: <input type="checkbox"/>

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"/>



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

PART A (continued) / PARTIE A (suite)

8. Will the supplier require access to PROTECTED and/or CLASSIFIED COMSEC information or assets?
 Le fournisseur aura-t-il accès à des renseignements ou à des biens COMSEC désignés PROTÉGÉS et/ou CLASSIFIÉS? 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



Contract Number / Numéro du contrat
Security Classification / Classification de sécurité

PART C - (continued) / PARTIE C - (suite)

For users completing the form manually use the summary chart below to indicate the category(ies) and level(s) of safeguarding required at the supplier's site(s) or premises.
 Les utilisateurs qui remplissent le formulaire manuellement doivent utiliser le tableau récapitulatif ci-dessous pour indiquer, pour chaque catégorie, les niveaux de sauvegarde requis aux installations du fournisseur.

For users completing the form online (via the internet), the summary chart is automatically populated by your responses to previous questions.
 Dans le cas des utilisateurs qui remplissent le formulaire en ligne (par Internet), les réponses aux questions précédentes sont automatiquement saisies dans le tableau récapitulatif.

SUMMARY CHART / TABLEAU RÉCAPITULATIF

Category / Catégorie	PROTECTED / PROTÉGÉ			CLASSIFIED / CLASSIFIÉ			NATO				COMSEC					
	A	B	C	CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET	NATO RESTRICTED / NATO DIFFUSION RESTREINTE	NATO CONFIDENTIAL / NATO CONFIDENTIEL	NATO SECRET	COSMIC TOP SECRET / COSMIC TRÈS SECRET	PROTECTED / PROTÉGÉ			CONFIDENTIAL / CONFIDENTIEL	SECRET	TOP SECRET / TRÈS SECRET
											A	B	C			
Information / Assets / Renseignements / Biens																
Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT Media / Support TI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IT Link / Lien électronique	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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
Security Classification / Classification de sécurité

PART D - AUTHORIZATION / PARTIE D - AUTORISATION

13. Organization Project Authority / Chargé de projet de l'organisme

Name (print) - Nom (en lettres moulées) Doug Sanftenberg	Title - Titre Construction Project Manager	Signature
Telephone No. - N° de téléphone 613-993-9628	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel Doug.Sanftenberg@nrc-cnrc.gc.ca
		Date June, 2016

14. Organization Security Authority / Responsable de la sécurité de l'organisme

Name (print) - Nom (en lettres moulées) Charlotte Carrier	Title - Titre Controlled Goods and Contracts Security Coordinator	Signature
Telephone No. - N° de téléphone (613) 993-8956	Facsimile No. - N° de télécopieur (613) 990-0946	E-mail address - Adresse courriel Charlotte.Carrier@nrc-cnrc.gc.ca
		Date 15 Jun 2016

15. Are there additional instructions (e.g. Security Guide, Security Classification Guide) attached?
Des instructions supplémentaires (p. ex. Guide de sécurité, Guide de classification de la sécurité) sont-elles jointes?

No / Non Yes / Oui

16. Procurement Officer / Agent d'approvisionnement

Name (print) - Nom (en lettres moulées) Alain Leves	Title - Titre Senior Contracting Officer	Signature
Telephone No. - N° de téléphone (613) 991-9980	Facsimile No. - N° de télécopieur	E-mail address - Adresse courriel alain.leves@nrc-cnrc.gc.ca
		Date 6-7-2016

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