



INVITATION TO TENDER ("ITT") No. PS10153

**SUPPLY AND DELIVERY OF MOTOR CONTROL CENTRE AND POWER
DISTRIBUTION CENTRE**

Tenders will be received in the Purchasing Services Office, 3rd Floor, Suite #320, East Tower, 555 West 12th Avenue, Vancouver, British Columbia, Canada, V5Z 3X7 prior to the Closing Time: 3:00:00 pm Vancouver Time (as defined in Note 2 below), June 29, 2010 and opened publicly June 30, 2010 at 11:00:00 am.

NOTES:

1. Tenders are to be submitted in sealed envelopes or packages marked with the Tenderer's Name, the ITT Title and Number.
2. Closing Time and Vancouver Time will be conclusively deemed to be the time shown on the clock used by the City's Purchasing Services Office for this purpose.
3. The City's Purchasing Services Office is open on Business Days 8:30 am to 4:30 pm Vancouver Time and closed Saturdays, Sundays, and holidays.
4. DO NOT SUBMIT BY FAX.

All queries related to this ITT shall be submitted
in writing to the attention of:

**Peter Yung
Buyer**

Fax: 604.873.7057 E-mail: purchasing@vancouver.ca

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PART A - INSTRUCTIONS TO TENDERERS

NOTE: The definitions set out in Part B - General Conditions - Section 1.0 "Definitions" apply throughout this ITT, including this Part A of this ITT, except where otherwise expressly stipulated or the context otherwise requires.

1.0 Description of Requirement

- 1.1 Tenders are invited for the supply and delivery of **Motor Control Centre and Power Distribution Centre for Kitsilano Park Pump Station** in accordance with the Requirements of this ITT for the City of Vancouver (the "City") as represented by its Engineering Department.
- 1.2 Tenderers are to submit Tenders for the full Requirements only. Partial responses may be put aside and given no consideration
- 1.3 The City will only consider Tenders for complete units ("Units") as described in Appendix 1 to 5 together with the Drawings available for pick up.
- 1.4 Drawings are available in CD format for pickup from 8:30 am to 4:30 pm at:

Purchasing Services
City Square
Suite 320, East Tower
555 West 12th Avenue
Vancouver, BC

2.0 Contract Term

- 2.1 The Term of any Contract awarded as a result of this ITT will start on the Effective Date and not expire until after the expiry of any applicable warranty period(s).

3.0 Pricing

- 3.1 Pursuant to Part A - Instructions to Tenderers - Section 11.2, Tenders are irrevocable and therefore the pricing within the Tender is also irrevocable and may not be withdrawn or altered after the Closing Time.
- 3.2 Prices quoted are to be exclusive of GST, PST and HST, except where expressly requested.
- 3.3 Prices shall be held firm for the term of the contract, unless otherwise expressly agreed to by the City.
- 3.4 Prices are to be quoted F.O.B. Destination, including freight, unloading at destination, import duties, brokerage, royalties, handling, overhead, profit and all other costs included.
- 3.5 Prices are to be quoted in Canadian currency.

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- 3.6 Quotations submitted will be valid and open for acceptance by the City for sixty (60) days after the closing date and time noted above.

4.0 Inquiries and Clarifications

- 4.1 It is the responsibility of the Tenderer to thoroughly examine these documents and satisfy itself as to the full requirements of this ITT. Inquiries are to be in written form only, faxed or e-mailed to the contact person shown on the cover page no later than five (5) business days prior to the closing time. If required, an addendum will be posted to the City's website.

5.0 Conduct of the Contract

- 5.1 The City's Manager of Supply Management shall have the conduct of the ITT on behalf of the City and will be the City's Designated Representative under the Contract.

6.0 Inspection of Site - Intentionally Omitted

7.0 Submission of Tender

- 7.1 The response to this ITT with all accompanying schedules, appendices or addenda submitted by the Tenderer will be received up to the Closing Time. Tenders are to be submitted utilizing Part E - Tender Form of this ITT and then enclosed in a sealed envelope or package, marked with the Tenderer's name and the ITT title and number.
- 7.2 Tenders are to submit their Tenders in the following format:
- a) Part E - Tender Form
 - b) Documents Required pursuant to Table on First Page of Tender Form
 - c) Appendix 7 - Certificate of Existing Insurance
- 7.3 Tenders received after the Closing Time or in locations other than the Drop-Off Location shown on the cover page, may or may not be accepted and may be returned unopened. The City may elect to extend the Closing Time.
- 7.4 The Tenderer shall submit four (4) copies of its Tender in accordance with the instructions stated in this ITT.
- 7.5 Tenders are to be submitted in English.
- 7.6 **The Tenderer is to enter its full corporate or legal business name on the first page of Part E - Tender Form. The Tender Form is to be signed in the place provided by an authorized signatory of the Tenderer. All other pages of the Tender Form are to be initialled by the authorized signatory in the spaces provided.**

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- 7.7 Amendments to a Tender may only be submitted if delivered in writing prior to the Closing Time in a sealed envelope or package, marked with the Tenderer's name and the ITT title and number.
- 7.8 Tenders are irrevocable after the Closing Time and so may only be withdrawn by written notice duly signed by the Tenderer's authorized signatory delivered to the Drop-Off Location shown on the cover page prior to the Closing Time.
- 7.9 All costs associated with the preparation and submission of the Tender, including any costs incurred by the Tenderer after the Closing Time, will be borne solely by the Tenderer.
- 7.10 By submitting a Tender, the Tenderer acknowledges and agrees that the liability of the City in connection with the ITT, the conduct or outcome of the ITT, all related processes, decisions and procedures, and any and all duties and obligations in connection with all of the foregoing, is limited in the aggregate to the maximum of \$1,000 (for any and all claims by the Tenderer combined with any and all claims of all other Tenderers and any and all other claimants in connection with the ITT), and that if payment is made by the City into Court (or into trust, for the benefit of all Tenderers and other such claimants, with a law firm reasonably selected for the purpose) of the said sum of \$1,000, then:
- a) that will be sufficient to fully release and discharge the City from all further liability; and
 - b) the Tenderer will, upon the request from time to time of the City, execute and deliver a release (in such form as the requesting party may reasonably prescribe).

8.0 Bid and Performance Security - Intentionally Omitted

9.0 Declaration - No conflict of Interest/ No Collusion

9.1 Declaration as to Conflict of Interest

The Tenderer now confirms and warrants that there is no officer, director, shareholder, partner or employee or other person related to the Tenderer's or organizations (a "person having an interest") or any spouse, business associate, friend or relative of a person having an interest who is:

- a) an elected official or employee of the City; or
- b) related to or has any business or family relationship with any elected official or employee of the City, such that there would be any conflict of interest or any appearance of conflict of interest in the evaluation or consideration of this Proposal by the City, except as set out in Part E - Tender Form - Section 1.2.

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9.2 Declaration as to Collusion

The Tenderer now confirms and warrants that

- a) the Tenderer has no affiliation, whether legal or financial, with any other entity which is in the business of providing the same type of goods or services which are the subject of this ITT; and
- b) the Tenderer is not competing within this ITT process with any entity which it is legally or financially associated or affiliated, except as set out Part E – Tender Form, Section 1.3.

10.0 Evaluation of Tenders

10.1 Tenders will be evaluated on the basis of the overall best value to City based on quality, service, price and any other criteria set out in this ITT including, but not limited to:

- a) the Tenderer's ability to meet the Requirements, qualifications and competencies set out in this ITT;
- b) financial offer including but not limited to prices, operating and maintenance costs, warranty, and any life cycle considerations;
- c) the Tenderer's business and technical reputation and capabilities; experience and where applicable, the experience of its personnel; financial stability; track record; and references of current and former customers;
- d) equipment quality, configuration, age and condition;
- e) preference may be given to tenderers with earliest delivery dates;
- f) Availability of parts;
- g) Shop capability to perform testing
- h) Post delivery support on installation; and
- i) any other criteria set out in the ITT or otherwise reasonably considered relevant.

10.2 The City may elect to short list some of the Tenderers and require short listed Tenderers to provide additional information or details, including making a presentation, supplying samples, demonstrations, and/or additional technical literature. Samples of items, when required, must be submitted within the time specified and at no expense to the City. If not destroyed in testing, they will be returned at the Tenderer's request and expense.

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- 10.3 Prior to Contract award, the Tenderer must demonstrate financial stability. Should the City so request, the Tenderer is required to provide annual financial reports or a set of financial statements prepared by an accountant and covering the last two (2) fiscal years.
- 10.4 The City may, prior to Contract award, negotiate changes to the scope of the Work, the materials, the Specifications or any conditions with any one or more of the Tenderers without having any duty or obligation to advise any other Tenderers or to allow them to vary their prices as a result of changes to the scope of Work, the materials, the Specifications, or any conditions, and the City shall have no liability to any other Tenderer as a result of such negotiations or modifications.
- 10.5 All Sub-contractors of the Tenderer will be subject to the same evaluation process. It is the responsibility of the Tenderer to guarantee that all its Sub-contractors will comply with all the Requirements and terms and conditions set out in this ITT.
- 10.6 Preference may be given to Tenders offering environmentally beneficial products or services.

11.0 Acceptance and Rejection of Tenders

- 11.1 Notwithstanding any other provision in the ITT documents, the City has in its sole discretion, the unfettered right to:
- a) accept any Tender;
 - b) reject any Tender;
 - c) reject all Tenders;
 - d) accept a Tender which is not the lowest Tender;
 - e) accept a Tender that deviates from the Requirements, Specifications or the conditions specified in this ITT;
 - f) reject a Tender even if it is the only Tender received by the City;
 - g) accept all or any part of a Tender; and
 - h) split the Requirements between one or more Tenderers.
- 11.2 All Tenders are irrevocable and remain open for acceptance for sixty (60) days after the Closing Time, whether or not another Tender has been accepted.
- 11.3 Any deviations from the Requirements, Specifications or the conditions specified in this ITT, must be clearly stated in the Tender. The City will be the sole judge as to what constitutes an acceptable Tender deviation. If no

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deviations are indicated in the Tender, the Tender constitutes a legally binding offer by the Tenderer to perform in full compliance with the Requirements, Specifications and conditions of this ITT.

- 11.4 The City may waive any non-compliance with the ITT, the Requirements, the Specifications, or any conditions, including the timing of delivery of anything required by this ITT and may elect to retain for consideration Tenders which are non-conforming, which do not contain the content or form required by the ITT or which have not complied with the ITT process for submission.

12.0 Award of Contract

- 12.1 Award of a Contract is contingent on funds being approved and the contract award being made by City Council, if applicable.
- 12.2 The City will notify the successful Tenderer(s) in writing that it has been awarded the Contract by issuing a Notice of Award.
- 12.3 The Notice of Award and subsequent purchase order terms and conditions, excluding the provision titled "The City's Offer", will apply unless otherwise agreed in writing by the City.
- 12.4 The Notice of Award, Tender, ITT, purchase order(s), and such other documents including all amendments or addenda, will form the basis for the Contract between the Contractor and the City. In the event of a conflict between any of the Contract Documents, the following documents will take precedence and govern over each other in the following order of priority from highest to lowest:
- a) the Notice of Award;
 - b) subject to Section 12.3, the City's purchase order including the standard purchase order terms and conditions (which may be downloaded from www.vancouver.ca/bid/terms.htm);
 - c) or any mutually agreed to written amendments between the Tenderer and the City;
 - d) the Tender; and
 - e) the ITT and any subsequent addenda.
- 12.5 Where the head office of the successful Tenderer is located within the City of Vancouver and/or where the successful Tenderer is required to perform any Work at a site located within the City of Vancouver, the successful Tenderer is required to have a valid City of Vancouver business license prior to Contract execution.

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- 12.6 The City is not under any obligation to award a Contract and may elect to terminate this ITT at anytime.

13.0 Quantities

- 13.1 The quantities stated in this ITT are the City's best estimates of its requirements and should not be relied on. Actual quantities may vary.

14.0 Brand Names - Intentionally Omitted

15.0 Alternates and/or Variations to Specifications

- 15.1 Except where otherwise stated, the Specifications describe what is considered necessary to meet the performance requirements of the City and Tenderers should bid in accordance with such Specifications, or if the Tenderer cannot meet the Specifications, the Tenderer may offer an alternative which it believes to be the equivalent.
- 15.2 Tenderers shall clearly indicate any variances from the City's Specifications or conditions no matter how slight. The attachment of descriptive literature from which variations may be gleaned will not be considered as a sufficient statement of variations.
- 15.3 If in addition to bidding on goods, materials, equipment and/or services that meet the Specifications, the Tenderer wishes to offer an alternative, the alternative Tender shall be submitted separately in the same format as the initial Tender.
- 15.4 The City is not obligated to accept any alternatives.
- 15.5 The City will determine what constitutes allowable variations.

16.0 Environmental Responsibility

- 16.1 The City is committed to preserving the environment. Tenderers shall provide environmentally sensitive products or services wherever possible. Where there is a requirement that the Contractor supplies materials, and where such materials may cause adverse effects, the Tenderer shall indicate the nature of the hazard in its Tender.
- 16.2 The Tenderer agrees to advise the City of any known alternatives or substitutes for such materials that would mitigate the effects of any adverse conditions on the environment.

17.0 Named Sub-contractors

- 17.1 The Tenderer agrees that the Sub-contractors shown in its Tender are the Sub-contractors that it proposes to use to carry out the Requirements. The

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Tenderer agrees to engage the listed Sub-contractors and no others in their stead without prior written authorization of the City.

- 17.2 The City may or may not reject Tenders from any Tender that proposes to sub-contract all or substantially all of the Requirements.

18.0 Access to/Ownership of Tender Information

18.1 ITT Documents Remain/Tender Becomes - City's Property

- a) All Tender packages and addenda provided to the Tenderer by the City remain the property of the City and must be returned to the City upon request.
- b) The documentation containing the Tender, once submitted to the City, becomes the property of the City, and the City is under no obligation to return the Tender.

18.2 Tenderer's Submission Confidential

Subject to the applicable provisions of the *Freedom of Information and Protection of Privacy Act* (British Columbia) and the City's full right to publicly disclose any and all aspects of the Tender in the course of publicly reporting to the Vancouver City Council on the Invitation to Tender results or announcing the results of the Tenders to the Tenderer, the City will treat all material and information expressly submitted by the Tenderer (and the City's evaluation of it) in confidence in substantially the same manner as it treats its own confidential material and information.

The Tenderer now irrevocably waives all rights it may have by statute, at law or in equity, to obtain any records produced or kept by the City in evaluating its Tender (and any other submissions) and now agrees that under no circumstances will it make any application to the City for disclosure of any records pertaining to the receipt, evaluation or selection of its Tender (or any other submissions) including, without limitation, records relating only to the Tenderer.

18.3 All City Data/Information is Confidential

The Tenderer will not divulge or disclose to any third parties any information concerning the affairs of the City which may be communicated to the Tenderer at any time (whether before or after the Closing Time). Recognizing the need for confidentiality of the City's data, files and other confidential information, the Tenderer will not use, exploit or divulge or disclose to third parties any confidential or proprietary information of the City of which the Tenderer may gain knowledge in connection with or in the course of discussions or negotiations with the City.

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All material and information that has or will come into the Tenderer's possession or knowledge in connection with this Tender process is confidential and may not be disclosed or utilized in any way except in accordance with this Invitation to Tender.

18.4 Disclosure Requires Prior Consent

The Tenderer may not divulge any information respecting the Tender process to any third party without the prior written consent of the City, which consent may be arbitrarily withheld unless it is information which the City has already made public or has been required to disclose pursuant to the *Freedom of Information and Protection of Privacy Act* (British Columbia).

18.5 Declaration of Confidentiality

The Tenderer now declares and agrees that, except for the information disclosed by the City in the course of publicly reporting to the Vancouver City Council or any public tender opening:

- a) the information supplied by the Tenderer in response to this Invitation to Tender is expressly provided in strict confidence;
- b) any records made of the evaluation of the Tenderer's Tender and all other submissions will be the property of, and private to, the City and will not be disclosed to the Tenderer nor anyone else;
- c) the disclosure of the information in items (a) and (b) above to anyone outside of the City's staff would reveal the Tenderer's trade secrets or proprietary commercial information concerning its private business affairs; and
- d) the disclosure of the information in items (a) and (b) above, could reasonably be expected to harm the Tenderer's competitive position, harm the City's ability to engage in competitive procurement of goods and services, and result in undue financial loss to the Tenderer and/or the City.

19.0 Special Conditions

- 19.1 Where Special Conditions are attached to this ITT and they conflict in any way with any other part of this ITT, the Special Conditions shall take precedence.

20.0 Required Documentation

- 20.1 The following documentation shall accompany each Unit at time of delivery. Failure to include all or some of the listed documents will delay the City's acceptance of the Unit:

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- a) Packing slip, packing list, bill of lading or customer receipt that includes and itemized detail of the package contents;
- b) Owner service policy and warranty;
- c) All other documents required by the Specifications to be delivered concurrently with the Unit.

20.2 The City of Vancouver address shown on the documentation should read:

Engineering Department – Sewer and Drainage Design
City of Vancouver
453 West 12th Avenue
Vancouver, BC
V5Y 1V4

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1.0 Definitions

The following words and terms, unless the context otherwise requires, shall have the meanings set out below. Words including the singular number include the plural and vice versa.

“Act of God” means a cataclysmic phenomenon of nature, including earthquake, flood or cyclone. Rain, snow, wind, high water or any other natural phenomenon, which might reasonably have been anticipated from historical records of the general locality of the City, shall be deemed not to be acts of God;

“BC Motor Vehicle Legislation” means all British Columbia legislation relating to the equipping and manufacturing of vehicles for operation in British Columbia and includes without limitation and by way of example only, the *Commercial Transport Act*, *Commercial Transport Regulations*, *Motor Vehicle Act*, and *Motor Vehicle Regulations* of British Columbia;

“City” means the City of Vancouver, a municipal corporation continued pursuant to the *Vancouver Charter*;

“City’s Designated Representatives” means the City’s employees or representatives who are authorized in writing to deal with the Contractor on behalf of the City in connection with the goods, materials, equipment and services or to make decisions in connection with the Contract, and includes the person or person holding the title set out in Part A – Instructions to Tenderers - Section 5.0 “Conduct of Contract”;

“Closing Time” means the closing date, time, and place as set out on the title page of this ITT;

“Contract” means the agreement formed between the City and the Contractor as evidenced by the City’s issuance of a Notice of Award;

“Contract Documents” means the ITT, any Amendments or Addenda issued pursuant to this ITT, the Contractor’s Tender, any City purchase order, and any changes to the foregoing agreed to in writing by the parties;

“Contract Price” means the price(s) for the Product and Work set out in the Tender Form;

“Contractor” means the successful Tenderer (whether an individual, partnership, corporation or combination of same, including joint venturers) who or which executes the Tender which is then accepted in writing by the City;

“Delivery Date” means the date(s) on which the City requires the Contractor to deliver the goods to the City’s Delivery Site;

“Delivery Site” means **Kitsilano Park Pumpstation, at the intersection of Arbutus Street and Cornwall Avenue**;

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“Effective Date” means that date which is seven (7) days after the date of award of this Contract by the City to the Contractor;

“F.O.B.” means all costs of freight, insurance, brokerage, customs duties and all other costs of delivery to the site named as F.O.B. will be borne by the Contractor and that ownership and title to all goods, materials, and equipment are transferred to the City when same are delivered by the Contractor to the City and the risk of loss or damage to the goods, materials and equipment transfers to the City only at such time as same are received and accepted by the City at the site named as “F.O.B.” or “Delivery Site”;

“GST” means the goods and services tax administered under the *Excise Tax Act* (Canada) and any successor tax or levy therefore in force from time-to-time, including for further certainty any increased GST pursuant to any harmonized sales tax legislation;

“HST” means any “harmonized” or collective sales, goods, and/or services tax that may come into effect during the term of this Agreement to replace or supplement the GST and/or PST payable pursuant to this Agreement as of the date hereof:

“ITT” means this Invitation to Tender including, but not limited to: Part A – Instructions to Tenderers; Part B – General Conditions; Part C – Special Conditions; Part D – Requirements; Part E – Tender Form; Appendix 7 – Certificate of Existing Insurance; Appendix 8 – General Certificate of Insurance; and any additional attachments listed in the Table of Contents; and any amendments, addenda, and/or clarifications pertaining to this ITT that may be issued prior to the Closing Time;

“Letter of Credit” means the security for performance required to be posted by the Contractor pursuant to Part B – General Conditions - Section 20.9 “Letter of Credit” and the Notice of Award;

“Minimum Warranty Period” means the period of time starting on the Effective Date and expiring one year after the Warranty Start Date for the last Unit delivered to and accepted by the City under this Contract;

“Notice of Award” means the document duly signed by an authorized signatory for the City evidencing the City’s acceptance of the successful Tenderer’s Tender by way of a signed copy of the “Acceptance” portion of Part E – Tender Form;

“Product” means, depending on the context, one or more Units;

“PST” means British Columbia provincial sales tax administered under the *Social Service Tax Act* and any successor tax or levy therefore in force from time-to-time;

“Requirements” means all of the Specifications, requirements and obligations of the Contractor set out in this ITT;

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“Security Clearance” means that level of security clearance required by the City or its police department for Contractor personnel accessing the information or premises required to be accessed in order to perform the Work under this Contract;

“Specifications” means that part of the Requirements set out in Appendix 3 - Detailed Equipment Specifications and Compliance Matrix;

“Tender” means an offer submitted by the Tender in response to this ITT and in substantial compliance with this ITT;

“Tenderer” means the individual, partnership, corporation or combination of same, including joint venturers, who or which are named as such on the first page of Part E – Tender Form;

“Unit” means – Motor Control Centre and Power Distribution Centre;

“Warranty” has the meaning set out in Section 14.0 “Warranty” of these General Conditions;

“Warranty Start Date” has the meaning set out in Section 14.5 of these General Conditions;

“WorkSafeBC” means the Workers Compensation Board, a provincial Crown corporation created pursuant to the *Workers Compensation Act* (British Columbia);

“WorkSafeBC Rules” means the *Workers Compensation Act* (British Columbia), including without limitation, the *Occupational Health & Safety Regulation* enacted pursuant to such Act, all as such Act or Regulations are amended or re-enacted from time to time;

“Work” means all the labour, materials, equipment, supplies, services and other items necessary for the execution, completion and fulfilment of the Requirements;

“Work Schedule” means those Requirements which relate to the dates and times by which the Contractor is required to deliver the Product and Work;

“Work Site” means the site where the Work is being performed.

2.0 Notices

2.1 Any notice required to be given in regards to the Contract(s) shall be given in writing and if addressed to the City will be sent to the civic address, fax number or e-mail address provided by the City from time to time for the City's Designated Representative, and if to the Contractor will be sent to the civic address, fax number, or e-mail address set out in its Tender or otherwise provided by the Contractor from time to time.

2.2 No notice will be deemed to have been received by the recipient unless and until its receipt is acknowledged by the recipient or, alternatively, is delivered

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by hand or sent by registered mail to the civic address (in which case it will be deemed to have been received on the first business day after its actual receipt or arrival at such civic address).

3.0 Assignment

- 3.1 Neither the Tender nor the Contract (nor any of the rights of payment under the Contract Documents) may be assigned, sub-let, or otherwise disposed of transferred in any way nor in whole or in part by the Contractor (except as expressly named and disclosed in Part E – Tender Form - Section 5.1 or expressly permitted pursuant to Section 5.0 below) without the prior written consent of the City, which consent may be arbitrarily withheld.
- 3.2 In the event that the City consents to any such assignment or other disposition, the Contractor will not be relieved of any of its obligations under the Contract and will remain fully liable under the Contract to perform the Requirements.

4.0 Independent Contractor

- 4.1 The Contractor, its Sub-contractors, the officers, directors, shareholders, partners, personnel, affiliates and agents of the Contractor and its Sub-contractors are not, nor are they to be deemed to be, partners, appointees, employees or agents of the City.

5.0 Sub-contractors

- 5.1 Subject to Section 5.2, the Contractor will not assign, sublet, subcontract, or let out as task work any part of the Requirements to any third party, without in each case the prior written consent of the City which consent the City may arbitrarily withhold.
- 5.2 Despite Section 5.1 above, the Contractor may utilize those Sub-contractors expressly named in Part E – Tender Form - Section 5.1 but only for the Area of Responsibility set out beside their name, provided always that the Contractor may not substitute or replace those Sub-contractors, or permit those Sub-contractors to further assign, sub-let, sub-contract, or let out as task work their obligations under the Contract Documents, except in accordance with Section 5.1 above.
- 5.3 If the City should consent to any such assignment, subletting or letting out as task work of all or any part of the Requirements, the Contractor shall in no way be relieved from its responsibility for the fulfillment of the Work, but shall continue to be responsible for the same in the same manner as if all the Work had been performed by the Contractor.
- 5.4 The City reserves the right to object to any of the Sub-contractors listed in a Tender. If the City objects to a listed Sub-contractor then the city will permit a Tenderer to, within five (5) business days, propose a substitute Sub-contractor

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acceptable to the City. A Tenderer will not be required to make such a substitution and, if the City objects to a listed Sub-contractor, the Tenderer may, rather than propose a substitute Sub-contractor, consider its Tender rejected by the City and by written notice withdraw its Tender. The City shall, in that event, return the Tenderer's bid security.

6.0 Time of the Essence

6.1 For all requests made by the City pursuant to the Contract, time is of the essence. The acceptance of a late performance, with or without objections or reservations by the City, shall not waive the right to claim damages for such breach nor constitute a waiver of the requirement of timely performance of any obligation remaining to be performed.

7.0 Laws, Permits and Regulations

7.1 The laws of British Columbia shall govern the Contract and the parties now irrevocably attorn to the jurisdiction of the courts of British Columbia.

7.2 All provisions of the *International Sale of Goods Act* (British Columbia) are specifically excluded from application of this Contract.

7.3 In carrying out the Requirements, the Contractor shall familiarize itself and comply with all applicable laws, bylaws, regulations, ordinances, codes, specifications and requirements of all regulatory authorities, and shall obtain all necessary licenses, permits and registrations as may be required by law.

8.0 Workplace Hazardous Materials Information System ("WHMIS")

8.1 The Contractor shall provide appropriate labels and material safety data sheets for WHMIS regulated products. No product containing asbestos shall be supplied at any time without written authorization from the City.

9.0 Product Standards

9.1 The Product shall comply with all standards referred to in the Specifications.

9.2 All electrical items shall comply with the relevant sections, latest editions, of versions of the Canadian Standards Association (CSA) standard C22.1, Canadian Electrical Code (CEC), Electrical Safety Branch - BC Amendments to CEC Regulations and Bulletins, the City's Electrical Bylaw, and the National Building Code.

10.0 Changes in Requirements

10.1 City May Request

The City may, by giving written notice to the Contractor, be entitled to request amendments to the Requirements. Upon receipt of such notice, the Contractor

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will, as soon as practicable and in no event later than five (5) days after receipt of such notice, inform the City of any adjustments to the Work Schedule or Contract Price, either advancing or delaying the Work Schedule or increasing or decreasing the Contract Price, that would be necessitated by such change in the Requirements, or will notify the City that no adjustment is required. If adjustments to the Work Schedule or Contract Price are necessary and the City confirms in writing that such adjustments are acceptable to it, the Requirements, Work Schedule, and the Contract Price will then be deemed to be amended as agreed by the City.

10.2 Disputes Over Requested Change

If the City determines that such adjustments, or no adjustments, to the Work Schedule or Contract Price are unacceptable and the City and the Contractor are unable to agree on a mutually acceptable adjustment to same, the City may elect to pursue any one of the following options:

- a) The City may refer the issue to arbitration to determine the appropriate adjustments pursuant to Section 25.0 "Dispute Resolution" (in which case the parties will be deemed to have mutually and irrevocably agreed to arbitration pursuant to Section 25.1).
- b) The City may proceed with this Contract without the proposed change in Requirements.
- c) The City may cancel all or any part of the Contract, provided the City gives the Contractor at least:
 - i) Ninety (90) days prior written notice of cancellation with respect to any given category of Product or Work (as those categories are set out in Tender Form), or
 - ii) One hundred and twenty (120) days prior written notice of cancellation with respect to a cancellation of all Product and Work (excluding any and all Product and Work already delivered).

10.3 Disputes as to Requirements (Where No Prior Change Request)

The City's Designated Representative may issue orders or instructions with respect to the timing, quality and quantity of the Work. They will be obeyed, performed and complied with by the Contractor promptly, efficiently and to the satisfaction of the City. However, if the Contractor is of the opinion that such orders or instructions are not authorized under the provisions of the Contract Documents or involve a change in the Requirements, it will so notify the City in writing before proceeding to carry them out and, in any event, within two (2) days of the receipt of such orders or instructions. The giving of such notice to and receipt by the City's Designated Representative will not

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constitute an acknowledgment by the City as to the validity of the claim, and the will then be at liberty to contest or dispute the claim. If the Contractor does not so notify the City within the time so limited, it will not be entitled to later claim that the orders or instructions were not so authorized or involved a change in the Requirements. Nevertheless, the giving of such notice to the City will not relieve the Contractor of its obligation to carry out and to obey such orders or instructions.

11.0 Delivery

- 11.1 Deliveries must be made between 8:00 am and 3:00 pm Monday to Friday, excluding statutory holidays, unless other arrangements have been agreed in writing. A material safety data sheet ("MSDS") must accompany all shipments containing products regulated under WHMIS legislation.
- 11.2 Deliveries must be made to the following address:
Kitsilano Park Pump Station, Kitsilano Park - Parking Lot Entrance, at the intersection of Arbutus Street and Cornwall Avenue.
- 11.3 Tenderer shall coordinate delivery of completed MCC to pump station with the on site installation contractor (to be named at a later date).

12.0 Quality of Workmanship and Materials

- 12.1 The Contractor shall perform the Work with the degree of care, skill and diligence normally applied in the performance of services of a similar nature and in accordance with sound current professional practices and conforming to the requirements set out in the ITT.
- 12.2 Materials, goods and equipment shall be new, free and clear of all liens, charges and encumbrances, the latest model, complete with all necessary accessories for operation and be the products of suppliers or manufacturers of established reputation engaged in the supply or manufacture of such materials or equipment.
- 12.3 Materials are to be applied in accordance with the manufacturer's directions and shall use the techniques and applications best suited for the type of material being used.

13.0 Inspection

- 13.1 All goods, materials, equipment and/or services are subject to inspection and approval upon delivery. The City has the right to refuse acceptance of such goods, materials, equipment and/or services that are not in accordance with the Specifications, Requirements or the Contractor's warranty (expressed or implied).

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- 13.2 Acceptance or rejection of the goods, materials, equipment and/or services shall be made as promptly as practical, but failure to inspect and accept or reject the goods, materials, equipment and/or services shall not relieve the Contractor from responsibility for such goods, materials, equipment and/or services that are not in accordance with the Contract.
- 13.3 The City shall be the final judge of all goods, materials, equipment and/or services in respect of both quality and quantity and its decisions of all questions in dispute with regard thereto will be final. Materials, goods or equipment not accepted will be returned to the Contractor at the Contractor's expense.
- 13.4 The City will not be deemed to have accepted the goods, materials, equipment and/or services by virtue of a partial or full payment for them.

14.0 Warranty

- 14.1 The Warranty set out in this Section 14.0 is the minimum warranty under this Contract. The Contractor is bound by all additional warranties set out in the Specifications and, where the City has selected any separately priced additional, optional or extended warranties by indicating same in the Notice of Award, the Contractor and City will be bound in the manner set out in the Notice of Award.
- 14.2 The Contractor warrants that, for at least one (1) year from the Warranty Start Date, the Unit supplied to, and Work performed by the Contractor for, the City will be in full conformity with the Requirements as well as samples, if any, and if so, then this is a sale by sample as well as by description within the meaning of the *Sale of Goods Act* (British Columbia).
- 14.3 The Contractor further warrants that for at least one (1) year from the Warranty Start Date, the Unit and Work will be of merchantable quality, and fit for the intended use and will perform according to the Requirements.
- 14.4 The warranty set out in Sections 14.2 and 14.3 above will include all parts and labour delivered and performed at the location of delivery of the Unit to the City.
- 14.5 The warranty start date ("Warranty Start Date") for each Unit is the date on which the City puts that Unit into service, or three months after acceptance of the Unit, whichever is sooner.
- 14.6 The City will notify the Contractor of the date that the Unit goes into service.
- 14.7 The warranty is to be in the name of the City of Vancouver, Engineering Department – Sewers & Drainage Design.

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- 14.8 The Contractor now warrants that all claims and representations made by the Contractor with respect to third party products and services have been fully authorized by that third party.
- 14.9 The Contractor warrants that its employees have the qualifications, experience, knowledge, skills and abilities necessary for the fulfillment of the Contract.

15.0 Protection of Person and Property

- 15.1 The Contractor shall use due care that no persons are injured, no property damaged or lost, and no rights are infringed in the performance of the Requirements, and the Contractor shall be solely responsible for all loss, damages, costs and expenses in respect of any injury to persons, damage of property, or infringement of the rights of others incurred in the performance of the Requirements or caused in any other manner whatsoever by the Contractor or those for whom in law it is responsible.
- 15.2 The Contractor shall effectively warn and protect the public and other personnel from any danger as a result of the performance of the Requirements.

16.0 Rectification of Damage and Defects

- 16.1 The Contractor shall rectify any loss or damage for which, in the opinion of the City the Contractor is responsible, at no charge to the City and to the satisfaction of the City. Alternatively, the City may repair the loss or damage and the Contractor shall pay to the City the costs of repairing the loss or damage forthwith upon demand from the City. Where, in the opinion of the City, it is not practical or desirable to repair the loss or damage, the City may estimate the cost of the loss or damage and deduct such estimated amount from the amount owing to the Contractor hereunder.

17.0 Clean Up - Intentionally Omitted

18.0 Indemnification

- 18.1 The Contractor shall indemnify, hold and save harmless the City from and against all claims, losses, damages, costs, actions and other proceedings made, sustained, brought or prosecuted in a manner based upon, occasioned by or attributable to any injury, including death, property damage, infringement or damage arising from any act or omission of the Contractor, its employees, officers, volunteers, servants, Sub-contractors, or agents or persons for whom the Contractor has assumed responsibility in the performance or purported performance of the Requirements.
- 18.2 The Contractor shall indemnify the City from and against any and all liability or expenses by way of legal costs or otherwise in respect of any claim which may be made for a lien or charge at law or in equity or to any claim or liability

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under the *Builders Lien Act* (British Columbia), or to any attachment for debt, garnishee process or otherwise.

- 18.3 The Contractor shall pay all royalties and license fees and shall save the City harmless from loss on account of suits or claims of infringement of patents in the performance of the Requirements.

19.0 Termination

- 19.1 The City will advise the Contractor by written notice of its intent to terminate the whole or any part of the Contract in any one of the following circumstances:
- a) if the Contractor fails to make delivery of the goods, materials, equipment and/or services within the time specified, or fails to perform any other provisions, terms or conditions of the Contract within the time specified, or within a reasonable time if no time is specified;
 - b) in the event that the Contractor performs any act or does anything by which the City shall incur any liability whatsoever;
 - c) any failure of the Contractor to meet the safety requirements of the Contract;
 - d) in the event that any creditor of the Contractor causes a writ of execution or similar writ or court order to be served upon the City requiring the City to pay any portion due to the Contractor under the Contract; or
 - e) in the event that the Contractor is adjudged bankrupt or if it makes a general assignment for the benefit of creditors or if it becomes insolvent or if it should take the benefit of any Act that may be in force for bankrupt or insolvent debtors.
- 19.2 Upon termination of the Contract, the City shall have no obligation to the Contractor except for such goods, materials, equipment and/or services as have been supplied up to the date of the termination of the Contract(s).
- 19.3 Upon termination of the Contract(s) in whole or in part, the City may procure similar goods, materials, equipment and/or services and the Contractor shall be liable to the City for any excess costs for such similar goods, materials, equipment and/or services. The Contractor shall not be liable for any excess costs if failure to perform arises by reason of strikes, lockouts, Acts of God or acts of the City. The City will not be liable where Delivery Sites are not available due to strikes, lockouts or Acts of God.

20.0 Insurance and Letter of Credit Requirements

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- 20.1 Without limiting any of its obligations or liabilities under the Contract, the Contractor and its Sub-contractors shall obtain and continuously carry during the term of the Contract at their own expense and cost, the following insurance coverages with minimum limits of not less than those shown in the respective items set out below.
- 20.2 All insurance policies shall be in a form and in amounts satisfactory from time-to-time and with insurers acceptable to the City's Manager of Supply Management and shall provide the City with sixty (60) days prior written notice of cancellation or material change resulting in reduction of coverage. Notice must identify the Contract title, number, policyholder, and scope of work.
- 20.3 The Contractor and each of its Sub-contractors shall provide at their own cost any additional insurance which they are required by law to provide or which they consider necessary.
- 20.4 Neither the providing of insurance by the Contractor in accordance with the requirements hereof, nor the insolvency, bankruptcy or the failure of any insurance company to pay any claim accruing shall be held to relieve the Contractor from any other provisions of the Contract Documents with respect to liability of the Contractor or otherwise.
- 20.5 The insurance coverage shall be primary insurance with respect to liability arising out of the operation of the Contractor. Any insurance or self-insurance maintained by or on behalf of the City, its officers, officials, employees, servants or agents shall be excess of this insurance and shall not contribute with it.
- 20.6 Within seven (7) days of the City's issuance of the Notice of Award, the Contractor shall provide the City with evidence of all required insurance in the form of Appendix 8 - General Certificate of Insurance. The Certificate of Insurance shall identify the Contract title, number, policyholder and scope of work and shall not contain any disclaimer whatsoever. At all times thereafter, throughout the term of this Contract, similar evidence of renewals, extensions or replacement of all required insurance must be forwarded to the City's Designated Representative prior to the effective date of same. At any time, and from time to time, and within seven (7) days of a request for same, certified copies of all insurance policies will be made available to the City's Designated Representative.
- 20.7 The Contractor shall provide in its agreements with its Sub-contractors clauses in the same form as those found herein. Upon request, the Contractor shall deposit with the City's Designated Representative detailed certificates of insurance for the policies it has obtained from its Sub-contractors and a copy of the insurance clauses so provided in the said agreements.
- 20.8 The Contractor shall obtain and maintain in full force and effect during the term of the Contract, insurance not less than that set out below and provided

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by a company duly registered and authorized to conduct insurance business in the Province of British Columbia.

a) Commercial General Liability

The Contractor will maintain Commercial General Liability insurance in sufficient amounts and description to protect the Contractor, its Sub-contractors, the City and their respective officers, officials, employees, and agents against claims for damages, personal injury including death, bodily injury and property damage which may arise under this Contract.

The limit of commercial general liability insurance shall be not less than five million dollars (\$5,000,000) per occurrence inclusive for personal injury, death, bodily injury or property damage and in the aggregate with respect to products and complete operations. The deductible per occurrence shall not exceed five thousand dollars (\$5,000) per occurrence.

The policy of insurance shall:

- i) be on an occurrence form;
- ii) add the City and its officials, officers, employees and agents as additional insureds;
- ii) contain a cross-liability or severability of interest clause;
- iii) extend to cover non-owned automobile, contingent employer's liability, blanket contractual liability, contractor's protective liability, broad form property damage, broad form completed operations and operations of attached machinery.

b) Third Party Auto Liability Insurance

The Contractor will maintain and cause its Sub-contractors to maintain Third Party Auto Legal Liability Insurance in an amount not less than five million (\$5,000,000) dollars per occurrence and Physical Damage Insurance for all vehicles owned, leased or operated by the Contractor in connection with this Contract.

c) All Risk Property Insurance

The Contractor will maintain all risks insurance protecting the Contractor and the City against physical loss or damage to each Unit and all components thereof in an amount of not less than the full Contract price and which insurance will terminate only upon safe delivery to and acceptance by the City. The policy will name the City as additional insured and loss payee with respect to its interest and will contain a waiver of subrogation in favour of the City. The policy will contain a deductible of no more than five thousand dollars (\$5,000) for each and every claim.

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20.9 Letter of Credit - Intentionally Omitted

21.0 WorksafeBC Compliance

- 21.1 Within seven (7) days of the Notice of Award, the Contractor must provide evidence that it is registered and in good standing with WorkSafeBC.
- 21.2 The Contractor agrees that it shall at its own expense procure and carry or cause to be procured and carried and paid for, full WorkSafeBC coverage for itself and all workers, employees, and others engaged in or upon any Work under this Contract.
- 21.3 The Contractor agrees that the City has the unfettered right to set off the amount of the unpaid premiums and assessments for such WorkSafe BC coverage against any money owing by the City to the Contractor. The City shall have the right to withhold payment under this Contract until the WorkSafe BC premiums, assessments or penalties in respect of work done or service performed in fulfilling this Contract had been paid in full.
- 21.4 The City now designates the Contractor as the Prime Contractor, and the Contractor now acknowledges and agrees to its designation as the Prime Contractor, in respect of all Work under this Contract for the purposes of the WorkSafeBC Rules.
- 21.5 The Contractor will indemnify the City and hold harmless the City from all manner of claims, demands, costs, losses, penalties and proceedings arising out of or in any way related to:
- i) unpaid WorkSafeBC assessments of the Contractor or any other employer for whom the Contractor is responsible under this Contract,
 - ii) the acts or omissions of any person engaged directly or indirectly by the Contractor in the performance of this Contract, or for whom the Contractor is liable pursuant to the Contractor's obligations as the Prime Contractor, and which acts or omissions are or are alleged by WorkSafeBC to constitute a breach of the WorkSafeBC Rules or other failure to observe safety rules, regulations and practices of WorkSafeBC, including any and all fines and penalties levied by the WorkSafeBC, or
 - iii) any breach of the Contractor's obligations under this General Condition.

22.0 Character of Workers

- 22.1 On the written request of the City, the Contractor will remove any employee, Sub-contractor or agent for any reason including but not limited to the following:
- a) lack of or failure to obtain any required Security Clearance;

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- b) intoxication;
- c) use of foul, profane, vulgar or obscene language or gestures;
- d) solicitation of gratuities or tips from any person for services performed under the Contract;
- e) willful, negligent or reckless action in disregard of safety or sanitary requirements or regulations; or
- f) any action which may constitute a public nuisance or disorderly conduct.

22.2 The Contractor will immediately comply with each such request and will then provide the City with all requested documentation verifying that the employee, Sub-contractor or agent has been removed from further involvement with this Contract.

23.0 Unavoidable Delay

23.1 Except for the performance of obligations to pay money, time periods for the City's and the Contractor's performance under this Contract will be extended for periods of time during which their performance is delayed or prevented due to an Unavoidable Delay. For the purposes of this section, an "Unavoidable Delay" means any circumstances beyond the reasonable control of the party trying to perform (such as, for example, strikes/lockouts, acts of God, war or other strike or governmental action) but expressly excludes any and all delays caused by the Contractor's lack of financial resources or insolvency, strikes, lockouts or labour affiliations of the Contractor's employees and Sub-contractors, or governmental action taken in the enforcement of law specifically against the Contractor.

24.0 Failure to Perform

- 24.1 Should the Contractor neglect to execute the Requirements properly or fail to perform any provision of the Contract, the City may, without prejudice to any other right or remedy it may have, make good such deficiencies and may deduct the cost thereof from the payment due to the Contractor.
- 24.2 If the Contractor fails to perform any provision of this Contract, the City may upon ten (10) days' written notice to the Contractor terminate the Contract without prejudice to any other right or remedy the City may have, including without limitation and by way of example only, the remedies set out in Section 24.1 above as well as any and all remedies afforded by any security for performance issued by the Contractor under this Contract, such as a performance bond, letter of credit, or insurance, all of which will survive any such termination of the Contract.

25.0 Dispute Resolution

- 25.1 All claims, disputes or issues in dispute between the City and the Contractor shall be decided by mediation or arbitration, if the parties agree, or failing

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agreement, in a court of competent jurisdiction within the Province of British Columbia and be governed by the laws of British Columbia.

- 25.2 In the event that the parties agree to arbitration pursuant to the above, the arbitration shall be governed by the rules of the British Columbia International Commercial Arbitration Centre, except that the arbitrator or arbitrators shall be agreed upon by the parties, and failing agreement by the parties, shall be appointed by a court of competent jurisdiction within the Province of British Columbia.
- 25.3 In the event that the parties agree to arbitration, the arbitration shall take place in the Lower Mainland, British Columbia and be governed by the laws of British Columbia.
- 25.4 The procedure set out in this section is not meant to preclude or discourage informal resolution of disagreements between the City and the Contractor.

26.0 Contract Price/Payment

- 26.1 The Contract Price is fixed and may not be changed by either party except to the extent mutually agreed upon by both parties in writing pursuant to Section 10.0 "Changes in Requirements".
- 26.2 The Contractor shall be paid net 30 days from receipt of invoice and acceptance of the goods, materials, equipment and or services, whichever is the later.
- 26.3 Copy of the Contractor's invoice to the City shall be submitted to: Engineering Department – Sewer and Drainage Design, City of Vancouver, 453 West 12th Avenue, Vancouver, BC, V5Y 1V4.

27.0 Taxes

- 27.1 Unless otherwise provided herein, the City will pay the GST and PST, and if and when applicable, HST on the Contract Price to the Contractor, provided that any increase or decrease in such GST and PST will proportionately increase or decrease the amount due under the Contract(s).
- 27.2 The Contract Price is deemed to be exclusive of GST, PST and HST. However, all other governmental taxes, levies, and fees, as well as all other costs relating to freight, handling, import duties, brokerage, royalties, handling, overhead, profit and any and all other costs are deemed to be included in the Contract Price.
- 27.3 Invoices must separately show the appropriate amounts for GST and PST and if and when applicable, HST.

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- 27.4 The parties agree that the Contract Price presently includes all duties, sales and social service taxes, excise taxes, personal property taxes on products, materials, construction machinery and equipment and other property owned or leased by the Contractor, and any other taxes, assessments, charges applicable to or arising directly or indirectly out of the performance of the work under the Contract other than the GST. The Contractor shall be registered in accordance with applicable laws and shall comply with all requirements hereunder to collect and remit GST and HST (as presently announced by the federal and provincial government to be effective July 1, 2010 for British Columbia and Ontario) and to pay or remit any other such taxes, assessments or charges. For greater certainty, on the harmonization of the PST with the GST, or the replacement of the PST with a value-added tax similar to the GST, the Contractor will decrease the Contract Price to the same extent that the Contractor is no longer required to pay the PST included in the Contract Price and is instead paying a recoverable value-added tax (or HST). If requested by the Owner, the Contractor shall make available to the representatives or auditors of the Owner, all relevant accounting books, tax records, invoices and other documents for inspection and audit during normal business hours. Any refund, rebate or credit in respect of PST or other taxes, assessments or charges payable arising directly or indirectly out of the performance of work under the Contract shall be for the benefit of the Owner and the Contractor shall participate and cooperate, as required, in any filing or application process necessary to initiate or complete the intent of this provision. The Contractor shall provide the Owner, at the Owner's request, such documents and particulars relating to the performance of work under the Contract in respect of which GST or HST is required to be paid by the Owner that are necessary to substantiate any claim for any input tax credits as may be permitted pursuant to the Excise Tax Act (Canada) or other applicable laws. The Contractor represents and warrants that the Contractor is not a non-resident of Canada for the purposes of the Income Tax Act (Canada) and that the Contractor has complied fully with the provisions of all applicable tax legislation, including, the Social Service Tax Act (British Columbia). The Contractor shall be liable to the Owner for: (i) any non-compliance with any of the Contractor's obligations under this paragraph; and (ii) any costs, penalties, assessments or other charges incurred by or levied against the Owner by reason of the Contractor being or becoming a non-resident of Canada for the purposes of the Income Tax Act (Canada).

28.0 Non-resident Withholding Tax

- 28.1 The *Income Tax Act* (Canada) requires that payments to non-residents for any work performed in Canada may be subject to a non-resident withholding tax. Exemption from this withholding tax is available in some circumstances, but the Contractor must apply directly to the Canada Revenue Agency (CRA) at least thirty (30) days before commencing the work and should seek the advice of a Canadian tax lawyer.
- 28.2 The City is legally required by the *Income Tax Act* (Canada) to withhold a specified amount from any payment to a non-resident (as defined in the Act) where no exemption certificate can be produced to the City by that non-

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resident. The amount of the withholding is determined by the residency of the non-resident and the applicable Income Tax Act Regulations.

29.0 Failure to Enforce

- 29.1 Any failure by the City to enforce or require the strict keeping and performance of any of the terms and conditions contained in this Contract will not constitute a waiver of such terms and conditions and will not affect or impair such terms and conditions in any way or the City's right at any time to avail itself of such remedies as the City may have for any breach or breaches of such terms and conditions.

30.0 Successors and Assigns

- 30.1 This Contract will benefit and bind each party and its successors and permitted assigns.

31.0 No Promotion of Relationship

- 31.1 The Contractor will not disclose or promote its relationship with the City, including by means of any verbal declarations, announcements, sales, marketing or other literature, letters, client lists, websites, internet domain names, press releases, brochures or other written materials (the "**Communications**") without the express prior written consent of the City (except as may be necessary for the Consultant to perform its obligations under this Agreement).

INVITATION TO TENDER NO. PS10153
SUPPLY AND DELIVERY OF MOTOR CONTROL CENTRE AND POWER DISTRIBUTION
CENTRE
PART C - SPECIAL CONDITIONS

[INTENTIONALLY OMITTED]

INVITATION TO TENDER NO. PS10153
SUPPLY AND DELIVERY OF MOTOR CONTROL CENTRE AND POWER DISTRIBUTION
CENTRE
PART D - REQUIREMENTS

1.0 BACKGROUND

Kitsilano Pump Station Upgrading:

- 1.1 The Kitsilano Sewage Pump Station is being upgraded by the City of Vancouver. Upgrades include the replacement of both electrical and mechanical components.
- 1.2 The existing electrical equipment at the station is proposed to be upgraded and includes the supply of a new MCC/PDC and related equipment.
- 1.3 The MCC/PDC and related equipment is being pre purchased by the City of Vancouver to expedite the pump station upgrade.
- 1.4 The Contract Documents specify the detailed requirements for the supply of the MCC/PDC and related equipment.

2.0 FIELD WORK

- 2.1 The completed MCC assembly shall be delivered to site by the MCC fabrication contractor in sections to accommodate placement inside the Kitsilano pump station.
- 2.2 The MCC fabrication contractor will be responsible for:
 - a) disassembly of the completed MCC into an adequate number of sections for delivery to site;
 - b) disassembly of section to section wiring and fasteners included in the final assembly;
 - c) coordinating with, assisting and instructing the site installation contractor in the installation of the MCC inside the Kitsilano pump station; and
 - d) reassembling the MCC sections complete with rewiring of section to section wiring and section to section fasteners.

3.0 GENERAL

- 3.1 This section specifies general requirements and procedures for contractors' submissions of shop drawings to Engineer for review. Additional specific requirements for submissions are specified in individual sections.
- 3.2 Until submission is reviewed, work involving relevant product may not proceed.
- 3.3 Present shop drawings in metric units.
- 3.4 Contractor's responsibility for errors and omissions in submission is not relieved by Engineer's review of submissions.
- 3.5 Notify Engineer, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

INVITATION TO TENDER NO. PS10153
SUPPLY AND DELIVERY OF MOTOR CONTROL CENTRE AND POWER DISTRIBUTION
CENTRE
PART D - REQUIREMENTS

- 3.6 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Engineer's review of submission, unless Engineer gives written acceptance of specific deviations.
- 3.7 Make any changes in submissions which Engineer may require consistent with Contract Documents and resubmit as directed by Engineer.
- 3.8 Notify Engineer, in writing at time of submission, of any revisions other than those requested by Engineer.

4.0 SUBMISSION AND CONTRACTOR'S REVIEW PRIOR SUBMITTAL

- 4.1 Contractor shall stamp each submission indicating that the submission has been reviewed by the Contractor for conformance and meets the requirements of the Contract Documents. Any deviations must be clearly noted in an attached memorandum and provide clear and precise explanatory notes. In addition:
 - a) Submissions not in accordance with these requirements will be returned to the Contractor for revision and resubmission.
 - b) The Engineer will not review the same submittal more than three times subsequent to which the Contractor will be back charged for the additional time spent by the Engineer reviewing additional submissions, such back charge to be deducted from the Contractors next progress payment.
- 4.2 Coordinate each submission with requirements of work and Contract Documents. Individual submissions will not be reviewed until all related information is available.
- 4.3 Allow minimum 3 days for Engineers review of each submission.
- 4.4 Accompany submissions with transmittal letter, in duplicate, containing:
 - a) Date
 - b) Project title and number.
 - c) Contractor's name and address.
 - d) Identification and quantity of each shop drawing.
 - e) Name and address of:
 - i Subcontractor.
 - ii Supplier.
 - iii Manufacturer.
 - f) Other pertinent data.

5.0 SHOP DRAWINGS

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PART D - REQUIREMENTS

- 5.1 Shop drawings: original drawings, or modified standard drawings provided by Contractor, to illustrate details of portions of work, which are specific to project requirements.
- 5.2 Maximum sheet size 1000 x 707 mm.
- 5.3 Submit 2 hard copies of shop drawings, along with a digital copy in PDF format.

6.0 PRODUCT DATA

- 6.1 Product data: manufacturer's catalogue sheets, brochures, literature, performance charts and manufactured products.
- 6.2 On all manufacturer catalogue sheets clearly indicate exact model # of component and related accessories that will be supplied.
- 6.3 Submit 2 hard copies of product data, along with a digital copy in PDF format.
- 6.4 Each sheet to be clearly identified with either an item number matching the Bill of Materials, or a brief description, clearly stating the proposed function of the item.

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CENTRE
PART E - TENDER FORM

Tenderer's Name: _____
"Tenderer"

Mailing Address: _____

Cheque Payable/Remit to Address: _____

Telephone No.: _____ Fax No.: _____

Key Contact Person: _____ E-mail: _____

GST Registration No.: _____ Incorporation Date: _____

City of Vancouver Business License Number: _____
(If your office is located in Vancouver or N/A if not applicable)

WorkSafeBC Account Number: _____

Dunn and Bradstreet Number: _____
(or N/A if not applicable)

Attach additional pages immediately behind this page for Sub-contractors, if applicable.

To the City of Vancouver,

The undersigned Tenderer, having carefully read and examined the ITT including the Instructions to Tenderers, General Conditions, Special Conditions, Requirements, Specifications and all addenda and having full knowledge of the Requirements described herein, does offer to provide the goods, materials, equipment and/or services in accordance with the Specifications, terms and conditions set out in the ITT (except as noted herein) and in accordance with the pricing set out in the Tender form.

INVITATION TO TENDER NO. PS10153
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CENTRE
PART E - TENDER FORM

Required Documents:

Description	Reference	Required	Received
Certificate of Existing Insurance	Appendix 7	Yes	

If the above documents do not accompany the Tender at the time of opening, the Tender is put aside and given no further consideration.

To be Initialled at Tender Opening:

Manager, Supply Management or designate

Witness

INVITATION TO TENDER NO. PS10153
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CENTRE
PART E - TENDER FORM

1.0 Compliance

- 1.1** By initialling each item, the Tenderer acknowledges it has read and understands the Requirements, has submitted the required addenda, has identified deviations or alternatives, and provided an explanation of where it does not comply with the Requirements.
- 1.2** With respect to Part A – Instructions to Tenderers - Section 9.1 “Declaration as to Conflict of Interest”, the Tenderer now conclusively declares there are no such conflicts of interest unless the Tenderer deletes this note and describes any and all relationships which might give rise to a conflict of interest or an appearance of a conflict of interest in the space provided for same in the Table below (by indicating “Does Not Comply” and providing the details under the Column entitled “Variations, etc.”).
- 1.3** With respect to Part A – Instructions to Tenderers - Section 9.2 “Declaration as to Collusion”, the Tenderer now conclusively declares there has been no such collusion unless the Tenderer deletes this note and describes any and all affiliations or relationships that might give rise to collusion or an appearance of collusion in the spaces provided for same in the Table below (by indicating “Does Not Comply” and providing the details under the Column entitled “Variations, etc.”).

Section Title	Understand, Will Comply	Does Not Comply	Variations, Alternatives or Explanation for Non-Compliance
<u>Part A (Except Sections 9.1 and 9.2)</u> Instructions to Tenderers			
<u>Part A - Section 9.1</u> Conflict of Interest (See Tender Form Section 1.2 above)			
<u>Part A - Section 9.2</u> Collusion (See Tender Form Section 1.3 above)			

INVITATION TO TENDER NO. PS10153
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2.0 References

- 2.1** The following is a list of references for similar goods, materials, equipment and/or services supplied by the Tenderer to other clients. The Tenderer agrees that the City may contact these references at its discretion. In addition, the City may also contact any other organization for the purposes of evaluating the Tenderer's company and Tender.

Name and Address of Company	Contact Name and Telephone Number	Brief Description of Work and Date Performed

INVITATION TO TENDER NO. PS10153
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CENTRE
PART E - TENDER FORM

3.0 Schedule of Price and Quantities:

Item	Description	Qty	Unit Price	Unit of Measure	Extended Price
1.	Motor Control Centre and Power Distribution Centre in accordance with the Specifications set out herein.	1	\$	Each	\$
2.	Shop Testing in accordance with the Specifications set out herein.	1	\$	Lot	\$
TOTAL					\$

3.1 Separately Priced Items:

Item	Description	Qty	Unit Price	Unit of Measure	Extended Price
a)	Site Delivery and Installation Assistance	1	\$	Lot	\$
b)	Field Services during Start Up	1	\$	Lot	\$
TOTAL					\$

INVITATION TO TENDER NO. PS10153
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4.0 Schedule

Item 1 and 2 - Motor Control Centre and Power Distribution Centre Delivery Schedule	Tenderers to indicate compliance or deviation with specifications below
<u>Delivery</u> MCC/PDC must be completely shop tested and ready for delivery on or before October 7, 2010. <u>State:</u> 1. Yes / No 2. If "No", state the earliest possible delivery date.	
<u>State:</u> Number of business days from the date of award to date of delivery. (Estimating one week for shop drawing review)	
<u>State:</u> Number of business days from the date of Shop Drawing Approval to date of delivery.	
<u>State:</u> Number of business days to Revise Shop Drawings after Drawings are Returned.	

5.0 Sub-contractors

5.1 Sub-contractors to be used in the performance of the Contract are listed below. (If no Sub-contractors will be used, indicate "Not Applicable").

Company Name, Address	Contact Name	Telephone No.	Area of Responsibility

INVITATION TO TENDER NO. PS10153
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CENTRE
PART E - TENDER FORM

6.0 Tenderer's Declaration

The undersigned Tenderer confirms that it has read and agreed to the Requirements of this ITT and that any and all deviations have been clearly noted.

The Tenderer agrees that if this Tender is accepted within one hundred and twenty (120) calendar days from the Closing Time, the undersigned Tenderer agrees to supply the City of Vancouver with all or any part of the items upon which prices are stated, at the price set opposite each item and to deliver the same at the designated point or points within the time specified, and in accordance with the Requirements set out in this Tender.

Authorized Signatory for the Tenderer

Date

Name and Title (*please print*)

INVITATION TO TENDER NO. PS10153
SUPPLY AND DELIVERY OF MOTOR CONTROL CENTRE AND POWER DISTRIBUTION
CENTRE
PART E - TENDER FORM

7.0 Acceptance of Tender

ACCEPTANCE

Date of Acceptance _____

The City hereby accepts the Tender for

- (a) the supply and delivery of the goods, materials, equipment and/or services described herein as the Motor Control Centre and Power Distribution Centre; and
- (b) the following Options: Post Delivery Installation Assistance and Field Services.

at the prices and on the Terms and Conditions set forth in the Tender:

City of Vancouver, by its authorized
signatory:

1.0 Scope of Work

- .1 The work includes all electrical and related work required to provide a complete working MCC / PDC assembly, complete with control panel for installation at the site and field wiring at the site by others. The complete unit includes but is not limited to the following:
 - .1 BC Hydro incoming section;
 - .2 Manual Transfer Switch;
 - .2 Revenue metering section c/w CTs and PTs (CTs and PTs supplied by BCH, installed by contractor);
 - .3 Motor Control Centre (MCC) and Power Distribution Centre (PDC) sections;
 - .4 Variable Frequency Drives assemblies and enclosures;
 - .5 Control Panel c/w HMIs;
 - .6 PLCs and I/O modules;
 - .7 Instrumentation;
 - .8 Shop testing of the completed MCC assembly and control panel as one unit to simulate field operation at one location with 600 VAC three phase power;
 - .9 Disassemble MCC sections as required for shipping to site and shipping to site;
 - .10 Co-ordination with onsite installation contractor or others who will offload the MCC and place the MCC sections in the Kitsilano pump station with direction, guidance and assistance from the MCC supplier.
 - .11 Re connection and re-wiring of section to section wiring disconnected for shipment to site to form a complete working assembly.
 - .12 Install seismic restraint harnesses/fasteners to the MCC assembly sections. Seismic restraints shall be designed by a Professional Engineer and shown on a sealed drawing. Seismic restraints will be connected by others on site.
 - .13 Testing and Commissioning on site to confirm the re- wiring on site is correct and assist the site contractor with testing the field wired devices.

2.0 Work Not Included

- .1 The following work items will be carried out by others:
 - .1 Offloading and installation at the site except as noted (i.e. MCC contractor to supervise offloading and installation and shall do all re-connection and section to section re wiring required;
 - .2 Programming of the PLC and HMI operator panel
(Contractor to supply and install PLC and HMI assemblies and software as specified along with all wiring and connect as shown on the drawings).
 - .3 Field wiring.

.4 RTU panel

3.0 Product Data and Operations and Maintenance Manuals

- .1 Provide product data for all electrical equipment in accordance with Section 16013 including but not limited to:
 - .1 VFD's;
 - .2 MCC and PDC sections and equipment;
 - .3 Manual transfer switch;
 - .4 Metering equipment;
 - .5 Wires and cables;
 - .6 Switches;
 - .7 Relays;
 - .8 HMIs;
 - .9 PLC equipment;
 - .10 Indicating lights;
 - .11 Instrumentation equipment;
- .2 All product data must be submitted to the Engineer for review in accordance with the requirements of Section and Section 16013
- .3 Operations and Maintenance Manuals shall be provided for electrical power, control and instrumentation systems. Brief, but comprehensive written descriptions must be provided for all equipment, devices and components.

4.0 Shop drawings

- .1 Provide shop drawings in accordance with Section 01340 and these specifications.
- .2 Submit two copies of shop drawings to the Engineer for approval. Engineer will return one reviewed set to the contractor.
- .3 Shop drawings shall include catalogue sheets, manufacturer's bulletins, wiring diagrams, dimensional data and operating descriptions of all items listed under Part 2 Products, in each section of the Specification.
- .4 Shop drawings shall include an interconnection diagram showing terminal numbers, number of conductors between components and requirements of inter-wiring conductors. This shall include any requirements for shielding, twisting or pairs, minimum and maximum resistance, capacitance, reactance, etc.
- .5 Submit breaker trip curves and fuse curves for all breakers or fuses of more than 50 ampere rating.

- .6 The Engineer will review shop drawings. Review of shop drawings does not relieve the Contractor from the requirement to provide equipment and systems in accordance with this specification and the contract drawings.
- .7 The Contractor shall also check manufacturers shop drawings. He shall ensure that the drawings and equipment meet the requirements of this specification.
- .8 Where equipment indicated in shop drawings is a manufactured; fabricated or assembled item which is unique, custom built or not mass produced, the equipment supplier shall not begin manufacture, fabrication or assembly of the item prior to review of shop drawings by the Engineer. The Contractor shall advise his suppliers of this requirement. The Contractor and supplier shall allow time for the Engineer's review of shop drawings when estimating delivery dates (allow minimum 3 days for Engineer's review for each submission).
- .9 Review submittals prior to submission to the Engineer. This review acknowledges that necessary requirements have been reviewed and verified, and that each submittal has been checked and coordinated with the requirements of the Work and the specifications.

5.0 Owner Supplied Equipment

- .1 SCADA system: The City of Vancouver or others will supply, install and connect SCADA equipment to the control panel supplied under this contract and as indicated on the drawings.

6.0 Equals and Substitutions

- .1 Where equipment and materials is specified by manufacturer, "or approved equal" is implied unless specifically noted otherwise. Submit full technical data with request for approval of equals, a minimum of 3 days prior to Tender closing.
- .2 Contractors who supply approved equals shall furnish revised wirings and mounting details where required. The Contractor shall pay for all additional Engineering costs related to installation of substituted equipment.

7.0 Shop Testing

- .1 The Contractor will make all arrangements for the Engineer to inspect and shop test in a functional shop environment the completed and wired MCC / PDC assembly including control panel in a manner to simulate field operations.
- .2 The Contractor shall assist the Engineer with the shop test as follows:

- .1 Provide 4 business days advance notice of proposed test date and written assurance that all components are wired and ready for testing in accordance with the specifications;
 - .2 Ensure all equipment is wired and ready for shop testing;
 - .3 Connect the MCC to a 600VAC, three phase power service;
 - .4 Energize all components and sections;
 - .5 Connect several components to the control panel PLC I/O for test simulation purposes, including two 4-20ma analog signal generators to test and calibrate analog instrument loops such as flow, level and pressure. The Engineer will provide further details prior to the shop testing.
 - .6 Provide test equipment, and personnel responsible for constructing and wiring the assembly available at the shop to assist with the shop testing.
 - .7 Have all equipment manuals for MCC, PDC and all control panel equipment available at the shop facility.
 - .8 Correct all deficiencies found during the testing as instructed by the Engineer.
 - .9 If the shop test is called for by the supplier and the MCC and PLC assemblies are not ready, not correctly wired or not operating as required the shop test will be cancelled. All costs incurred by the Owner to reschedule the shop test will be charged to the supplier.
 - .10 As built drawings to be available for shop test.
- .3 See additional Shop Testing Requirements in Section 16920.

8.0 Codes and Standards

- .1 CSA C22.1 latest edition of the Canadian Electrical Code.
 - .2 EEMAC M1-7
 - .3 IEEE 519-1992
 - .4 NEMA MG1
- .5 All MCC sections, panels, cabinets and equipment shall conform and be designed and manufactured in accordance with applicable and current CSA Standards and all Local and Provincial regulations.
- .6 CSA Approval Labels shall be attached to all components and to the complete assembly.**
- .7 Do complete installation in accordance with the latest revision of CSA code and with all Provincial, Municipal and local By-laws and regulations in force during the work.

- .8 Comply with CSA Certification Standards and Electrical Bulletins in force at time of Quotation.
- .9 Abbreviation for electrical items: to CSA Z85-1983
- .10 Wiring to confirm to the more stringent provisions of the National Code or the Canadian Electrical Code.

9.0 General Electrical Practice

- .1 Ensure all complete work is free of short circuits and unspecified grounds and operates properly to the satisfaction of the Engineer.
- .2 Check all electrical equipment for continuity and conformance to drawings and report any discrepancies to the Engineer in writing.
- .3 Provide brackets, supports and hardware for installation of electrical equipment.
- .4 Inspect, test, megger, clean, adjust and calibrate equipment and services installed by the contractor prior to energizing as specified by the Engineer or manufacturer, to the approval of the Engineer,
- .5 Place "HOLD" tags on all electrical power and control systems, tagging out power to the panels and racks, as required to protect the work from damage which could result from premature use.

10.0 Voltage Ratings

- .1 Operating voltages: to CAN3-C235-83.
- .2 Control and distribution devices and equipment to operate satisfactorily within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

11.0 Materials

- .1 Equipment and material to be new, CSA certified, and manufactured to standard quoted.
- .2 Where there is no alternative to supplying equipment which is not CSA certified, obtain special approval from Inspection Department.

12.0 Equipment Identification

- .1 Identify electrical equipment with nameplates as follows:
 - .1 Switches.
 - .2 Terminal blocks.
 - .3 Other similar or related equipment requiring identification.
 - .4 Relays, power supplies.
 - .5 Panels and displays units.
 - .6 Digital displays.
 - .7 Indicating Lights.
- .2 Nameplates:
 - .1 Lamicoid 3 mm thick plastic engraving sheet, 6 mm high letters unless specified otherwise, white face, black core, self adhesive.
 - .2 Provide a preliminary list of nameplates for review and approval by Engineer prior to manufacture and installation. Revise as directed by Engineer.

13.0 Wiring & Cable Identification

- .1 All wiring & cables (both power and control) shall be clearly identified with the numbers shown on the drawings.
- .2 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of feeders and branch circuit wiring. Use "Grafoplast Trasp" system 2000 with medium size black print as per 050C field kit.
- .3 Provide Electrovert strap-on S markers or T & B Tyrap identification cable ties. Ties are to be applied at every entrance or exit from a structure or piece of equipment.
- .4 Maintain colour coding throughout.
- .5 Colour code: to CSA C22.1-1986.
- .6 Use numbered and colour coded wires in instrumentation and communication cables, matched throughout system.

14.0 Mounting

- .1 Mounting height of equipment is from finished floor to centerline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not indicated, verify before proceeding with installation.

15.0 Protection

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark live parts "LIVE 120 VOLTS", or with appropriate voltage in English.

16.0 Test and Commissioning on Site

- .1 The site installation contractor will install and field wire the MCC/PDC unit on site. The MCC/PDC contractor shall assist in the MCC/PDC installation including rewiring section to section or other internal wiring, components or fasteners disconnected for shipment to site and ensure that the site contractor installs the unit correctly.
- .2 The MCC/PDC supplier shall inspect the completed site installation and confirm that the MCC/PDC field wiring and connections is adequate for start up and commissioning.
- .3 Following installation and field wiring of the MCC/PDC the MCC/PDC Contractor shall return to site and assist in the start up and commissioning of the MCC/PDC at the site as follows:
 - .1 Co-ordination and advance scheduling with the site contractor to start up and commission the MCC/PDC;
 - .2 Providing representatives from the VFD supplier, PLC supplier and other equipment suppliers who provided equipment for installation in the MCC/PDC which requires site programming and/or calibration;
 - .3 Providing a qualified electrical representative to correct or rectify any MCC/PDC wiring or component's deficiencies or similar issues which were not found during the shop testing but require correction on site to provide a complete working installation.
 - .4 The MCC/PDC supplier shall allow for a minimum of two days for each equipment suppliers representative on site.

END OF SECTION

PART 1 - GENERAL

1.1 Service - General

- .1 Provide service main breaker, secondary disconnect switches and breakers, metering transformer section, and all associated accessories.
- .2 B.C. Hydro meter to be located inside the pump station to BC Hydro requirements.
- .3 See section 16920, Motor Control Centre assembly / PDC and other Division 16 Sections for Main Distribution Centre requirements.

1.2 Manufacturers

- .1 All distribution equipment shall be of one the following manufacturers or approved equal.

Manufacturers are: Cutler-Hammer / Westinghouse
 Federal Pioneer Electric
 Square D
 Moeller
 GE
 Siemens

1.3 Service Drawings

- .1 The scope of work is outlined in the tender drawings. The contractor shall do the work in accordance with the tender drawings and the standard requirements of BC Hydro. If the Contractor is unfamiliar with their standards he shall acquire these standards prior to tender close, and base his price on these standards.

PART 2 - PRODUCTS

2.1 MCC assembly

- .1 Service and distribution components to have fault current rating as outlined in section 16920.

2.2 Lighting Panel

- .1 Provide panelboards, complete with circuit breakers with characteristics as noted on panel schedules.
- .2 Panels shall be complete with main breakers as noted on panel schedules.

- .3 Panel manufacturers to be one of the following or approved equal:
The new Cutler-Hammer / Westinghouse
Federal Pioneer Electric
Square D
Siemens
Moeller
Panel and breakers have to match the MCC make and model.
- .4 Breakers shall be minimum fault current rating as shown in section 16920 A.I.C. bolt on type or stab-lock type. Breakers feeding transformers shall have instantaneous trip at 12 times breaker rating.
- .5 Panels shall be fitted with trim and latch. Mounted in the MCC section as shown.
- .6 Provide typed, as-built panel schedule inside panel door.

2.2 Circuit Breakers

- .1 Enclosed circuit breakers shall have minimum instantaneous trip of 12 times breaker rating.
- .2 Submit breaker trip curves with shop drawings.
- .3 Enclosure shall be surface mount EEMAC 1.
- .4 Service main breaker shall be CSA rated for service entrance application.

2.3 Metering Transformer Enclosure

- .1 Provide and install BC Hydro approved enclosures.
Enclosure to be a part of MCC / PDC assembly.
- .2 Confirm dimensions with BC Hydro prior to ordering.

2.4 Uninterrupted Power Supply (UPS)

- .1 Provide UPS as shown on the electrical drawings.
- .2 The UPS shall be complete with an alarm contact.

END OF SECTION

PART 1 - GENERAL

1.1 Scope of Work

- .1 The Contractor shall supply and install the following equipment and systems:
 - a) Pump Control Panel;
 - b) PLC – see drawings for Bill of Materials;
 - c) HMI – see drawings for Bill of Materials;
 - d) Other related instruments and instrumentation control panel items.

1.2 General Requirements

- .1 Unless specifically stated otherwise, all equipment covered by the specification shall be suitable for operation in buildings or enclosures where minimum and maximum ambient temperatures are expected to be between -20° C and 40° C respectively.
- .2 All devices shall be designed for continuous operation. Field located devices shall be suitable for continuous operation in a humid atmosphere.
- .3 Provide, except where otherwise specified, the materials of construction necessary for satisfactory operation on the service specified. Any changes from specified materials must be approved in writing.
- .4 All instruments shall be factory calibrated to values stated in the documents, or as determined from process requirements.
- .5 All instruments and devices on panel fronts and all devices in the panel rear shall be identified by a legend plate or nameplate.
- .6 Finish shall be manufacturer's standard, but must include a prime coat and two finish coats of the same color as the MCC.
- .7 All process equipment packages which include control devices must provide interconnection and termination systems between all devices and equipment supplied. This shall include, but not be limited to terminal strips for field connections, bulkhead plates for cable and piping terminations, any local controls and all other control accessories as would normally be required on such an installation. Such installations must comply with applicable codes of good practice to ensure sound, reliable operation when installed. The Contractor shall obtain detailed installation instructions from all equipment suppliers. This shall include wiring drawings and mechanical drawings showing equipment installation in pump stations.
- .8 The Contractor shall provide complete sets of internal wiring diagrams, trouble-shooting data and calibration manuals for each device supplied.

- .9 All instruments shall include a 12 month supply of consumables. Spare fuses and lamps shall be shipped with control panels. Supply of not less than six of each type and size used in the panels.
- .10 All instruments requiring AC power supply shall be for 120 volts, 1 phase 60 hertz, or 24 VDC.

1.3 Standards

- .1 Equipment shall be CSA approved where standards have been established by that agency.
- .2 The entire Control Panel assembly shall bear CSA sticker.

PART 2 PRODUCTS

2.1 Pump Control Panel

- .1 Panel shall be assembled in a certified panel shop. Complete wiring and layout drawings showing dimensions are required for approval prior to manufacture.
- .2 Control devices, arrangement and dimensions for the panel are indicated on the contract drawings. Contractor shall be responsible for checking wiring and dimensional details of actual components supplied to insure proper assembly and wiring.
- .3 All 4 – 20 mA DC and instrument wiring shall be shielded.
- .4 Provide separate overcurrent protection for control power going to PLC.
- .5 Shop drawings shall show any changes required to comply with .2 above.
- .6 Pump control panel shall match height and depth of MCC line-up (see Section 16920).
- .7 Pump control panel door shall have continuous piano type hinge on one side as shown on the drawings.
- .8 Pump control panel door shall be fully gasketed for dust resistance and have a print pocket inside the door.
- .9 Pump control panel door shall have locking automotive type latch with 3 point latching mechanism and stay bars. Provide minimum six spare keys for door lock.

- .10 Pump control panel shall be complete with a rear and right hand side mounting panel, 12 gauge steel, fastened on collar studs. Provide stiffening bars as required.
- .11 Pump control panel shall be degreased, primed, and painted with two coats of automotive quality spray on gloss enamel. Color shall match MCC line-up on exterior and be white on interior.
- .12 Provide panel devices as follows for the MCC and pump control panel:
 - a) Control Relays
 - 24 VDC and 120 VAC coil relays shall be as shown on the drawings.
 - Relay manufacturer and type shall be Allen Bradley type HA or Omron general purpose relays.
 - b) Indicator Lights
 - Indicator lights shall be oil and dust tight bulbs, colour as indicated on the drawings.
 - Acceptable model: Senasys CMC type, complete with legend plates, colour inserts and related appurtenances as indicated on the drawings.
 - Supply legend plate and colour insert information with shop drawings prior to ordering.
 - Requests for alternatives will not be entertained
 - c) Selector Switches
 - Selector switches shall be as shown on the drawings.
 - Acceptable model: Senasys CMC type, complete with contact blocks, legend plates, colour inserts and related appurtenances as indicated on the drawings.
 - Supply legend plate and colour insert information with shop drawings prior to ordering.
 - Requests for alternatives will not be entertained
 - d) Push Buttons
 - Push buttons shall be as shown on the drawings.
 - Acceptable manufacturers: Allen-Bradley, ABB, or approved equivalent.
 - e) Control Circuit Breakers
 - Control circuit breakers shall be as shown on the drawings.

- f) Control Fuses
 - Control fuses shall be as shown on the drawings.
- g) Terminal Blocks
 - Terminal blocks shall be as shown on the drawings.
 - Provide terminal block end barriers, partition plates, and all other accessories required to construct complete terminal block wiring assemblies as indicated on the drawings.
 - Provide custom engraved snap in terminal block wire number tags on both sides of terminals. Engrave with control wire no. as per terminal block wiring diagrams. Engrave with control wire no. as per terminal block wiring diagrams following shop drawing approval. Submit wire no. schedule for shop drawing approval.
- h) Mounting Rails
 - Provide mounting rail channel for all rail mounted control devices and terminal blocks.
- i) Wiring Channel
 - Provide "Panduit" type wiring channel with width and depth as indicated on the drawings. Channels shall be complete with snap on covers.
- j) 24 VDC Power Supplies
 - Power supplies shall be as shown on the drawings.
- k) Control Transformers
 - Provide copper wound, screw terminal type control transformers with voltage and power characteristics as indicated on the Schematics; Hammond MH series.
- l) Remote Terminal Unit (RTU)
 - The existing SCADA/RTU panel and associated equipment are to be provided by the City or others as indicated on the drawings.
- m) Programmable Logic Controller (PLC)
 - Station control shall be provided by two redundant PLC's (PLC-01 & PLC-02), each consisting of the components listed in the Bill of Materials (See Drawing 1972-406).

- Provide two (2) licensed copies of PLC programming software
- n) HMI display panel
 - Station operator terminal shall be provided by two redundant HMI's (HMI-01 & HMI-02), each consisting of the components listed in the Bill of Materials (See Drawing 1972-406).
 - Provide two (2) licensed copies of HMI programming software

PART 3 - EXECUTION

3.1 Pump Control Panel

- .1 Fabricate, install and connect as shown on drawings.
- .2 Test function of all components including all alarm connections.

3.2 Programmable Logic Controller & Human Machine Interface

- .1 The Contractor shall supply and install the PLC's/HMI's in the control panel and wire to devices and terminals as indicated on the drawings.
- .2 The Contractor shall confirm the communication cabling between the PLC's and HMI panels has been set-up correctly prior to scheduling the shop test.
- .3 The Engineer will load the program into the PLC and HMI at the time of commissioning the pump station and/or shop testing.

3.3 Shop Test Panel

- .1 Shop test panel with other MCC and PDC assemblies as indicated in Section 16010.

3.4 Earthquake Restraint

- .1 Ensure all equipment in the control panel is securely fastened as per the manufacturer's installation instructions. Provide earthquake restraint support bracing and anchor bolt fastening to prevent horizontal movement or tipping of all service equipment and in accordance with Section 16010.

END OF SECTION

PART 1 - GENERAL

1.1 Scope of Work

- .1 Supply Motor Control Centre (MCC) assembly with breakers, motor circuit protectors, soft starters, and other equipment as shown on Single Line and/or Block Diagrams and Electrical drawings.
- .2 Supply Power Distribution Centre (PDC) assembly, BC Hydro wireway, main breaker and BC Hydro metering and service equipment, manual transfer switch (MTS) and related items and equipment as shown on Single Line and/or Block Diagrams and Electrical drawings.
- .3 Coordinate with control panel to ensure all MCC, PDC and control panel enclosures and equipment are correct sizes and conform to contract requirements.
- .4 Coordinate with Variable Frequency Drives supplier to ensure all panel enclosures and equipment are correct sizes and conform to contract requirements.
- .5 Shop test complete MCC, PDC, VFD's and control panel prior to delivery to site. See Section 16010.

1.2 Standards

- .1 MCC and PDC assemblies shall be manufactured in accordance with EEMAC and NEMA Standards and shall carry CSA approval number on the nameplate.
- .2 All electrical components in the MCC shall have a CSA label. The MCC and PDC shall be constructed to CSA Standard C22.2, No. 14, 1987.
- .3 The MCC and PDC shall meet all requirements of the Workers Compensation Board of B.C.
- .4 The MCC and PDC shall be assembled in the Greater Vancouver area. It shall be available for shop testing by the Engineer.

1.3 Manufacturer

- .1 The following firms are approved MCC/PDC vendors:
 - Vector Drive Systems
 - Allen Bradley Canada Ltd.
 - Schneider Electric Canada Inc.
 - Eaton/Cutler Hammer Canada Ltd.
 - Moeller Electric
 - Siemens

- .2 The manufacturer shall become familiar with the conditions of the installation site and operating conditions and system characteristics. He shall ensure that the MCC and PDC assemblies supplied are suitable for operation under these conditions.

1.4 System Characteristics

1.4.1 BC Hydro power supply

- a) 347/600 volts, **three phase**, 4 wire, 60 hertz
- b) System solidly grounded at MCC. Wye neutral
- c) Maximum available short circuit current – 42,000 amps.

1.4.2 Generator power supply characteristics (Generator is City owned portable unit)

- a) 347/600 volts, **three phase**, 4 wire, 60 hertz
- b) System solidly grounded at generator. Wye neutral
- c) Maximum available short circuit current – 42,000 amps

1.5 Operating Characteristics

- a) Location: Vancouver, B.C.
- b) Elevation: Sea level
- c) Atmosphere: Clean
- d) Maximum Temperature: 40 degrees C
- e) Minimum Temperature: -20 degrees C

1.6 Drawings

- .1 The MCC, PDC, control panel, VFD assemblies and other related items shall be constructed in accordance with the One Line Diagram, layout, Control Schematics and other electrical drawings.
- .2 The Contractor shall co-ordinate any minor control wiring changes necessitated by information received from his equipment suppliers after closing of bids. These changes shall be made at no cost to the owner.

1.7 Shop Drawings

- .1 Shop drawings to section 01340.
- .2 Shop drawings shall show layout and sections of MCC, PDC and VFD assemblies, all overall dimensions and all mounting dimensions.
- .3 The Contractor shall co-ordinate shop drawings to ensure the Scope of Work of the MCC, PDC and VFD manufacture and the panel shop completing custom wiring is clear. MCC and related shop drawings should be submitted together

with a letter explaining the scope of each set of drawings provided by the Contractor and stamped by the Contractor that the submittal conforms to the Contract Documents as required in Section 01340.

- .4 Shop drawings shall include a tabulation of each unit giving nameplate engraving, breaker sizes, contactor and overload relay rating, breaker and overload trip adjustment ranges.
- .5 Co-ordinate with site installation contractor to confirm final MCC and PDC assembly does not conflict with entry of field wiring for slab conduits, cable trenches, cable tray, cable entry's and other items which could result in a field conflict. Co-ordination to include reviewing MCC/PDC assembly drawings at the site with the installation contractor.

1.8 Shop Tests

- .1 Shop testing shall include the following activities:
 - a) Continuity to verify connections.
 - b) High Pot or Dielectric tests.
 - i) Each phase and ground bus with all neutrals and control circuit grounded and all contacts closed.
 - ii) Each control circuit and neutral and the ground bus with the neutral disconnected from ground, all phases grounded, and all contacts closed.
 - c) One certified copy of the results of these tests shall accompany the MCC and PDC when it is shipped to the site.
 - d) One certified copy of the results of these tests shall be mailed to the Engineer at the time of shipment.
- .2 Additional **shop testing** of MCC, PDC, VFD's and control panel to simulate field operation will be carried out as indicated in Section 16010 by the Engineer before shipment to the site. Notify Engineer minimum four (4) working days in advance. Witnessed shop testing shall include the following activities:
 - .1 Power checks
 - a) Checking all 600VAC MCC, PDC, VFD wiring, equipment and devices by connecting 600VAC, three phase power to the MCC and PDC and confirming the correct operation of all connected devices including the transfer switch and "all points meter" display, simulating operation on generator power.

- b) Checking all 600VAC MCC, PDC and VFD wiring, equipment and devices by connecting 600VAC, three phase power to the MCC and PDC and confirming the correct operation of all connected devices including the transfer switch and "all points meter" display, simulating operation on BC Hydro power.
- .2 Checking all 120VAC PDC and MCC wiring, equipment and devices by connecting 120VAC, single phase power to the PDC control circuitry and confirming the correct operation of all connected devices.
- .3 Checking ground fault trip circuitry for correct operation.
- .4 All items found deficient during testing as determined by the Engineer shall be corrected and retested until approved by the Engineer.
- .5 Simulated pump control operations using PLC and I/O. Contractor shall supply signal generator for simulation of 4-20mA analog signals.

PART 2 - PRODUCTS

2.1 MCC General Construction

- .1 The MCC assembly shall be NEMA Class II Type B, Type 1 general purpose enclosure with gaskets
- .2 The MCC shall be front mounted and have floor mounting channel and lifting angles.
- .3 Buswork shall be tin plated aluminum.
- .4 Vertical bus shall be rated minimum 400 amps.
- .5 Horizontal bus shall be rated 1200 amps, and located at the top, with provision for extension to the right and left.
- .6 The MCC shall have 600 amp rated continuous ground bus.
- .7 Bus bracing shall withstand 42,000 amp RMS asymmetrical and short-circuit current.
- .8 Vertical sections shall be to the sizes and dimensions shown on the drawings and shall have mechanical interlocking and wiring between units.
- .9 MCC shall consist of modular vertical sections bolted together to form a rigid, free-standing, dead-front assembly, and shall be designed as to permit future additions or changes of individual units and extensions to the MCC by the user.

MCCs shall be a complete working assembly, with components, units and wiring as specified herein.

- .10 MCCs shall have units mounted in front of board only. MCC sections will be installed back-to-back and there will be no access to the rear.
- .11 Wiring shall be EEMAC Class 1- B.
- .12 All bus connections shall be front accessible for servicing.
- .13 Provide a 6mm x 50mm horizontal copper ground bus running the length of the MCC. Provide lugs for grounding cables.
- .14 All units, except those too heavy or bulky to manipulate, shall be plug-in.
- .15 Each unit shall be automatically connected through a grounding finger to a vertical ground bus as it is inserted.
- .16 The MCC shall be painted ASA Grey 61.
- .17 Individual compartments shall include barriers so as to minimize the possibility of ionization occurring within a compartment spreading to other compartments.
- .18 There shall be provision for top and bottom entry of cables and conduit and there shall be entry plate for the bottom of each section.
- .19 Control wiring shall be tagged at both ends in accordance with the drawings.
- .20 Plastic tubular wire markers shall be used throughout.
- .21 Control wiring terminals shall be marked in accordance with the drawings.
- .22 Pushbuttons, pilot lights and selector switches etc., shall be heavy duty oiltight. They shall be identified with lamcoid nameplates as specified in Section 16010.

2.2 Detailed MCC Description

- .1 The Motor Control Centre shall contain the following:
 - a) One incoming section, complete with main lugs for 4 #350 MCM copper or 4#500 MCM aluminum conductor per phase.
 - b) Motor starters and Variable Frequency Drives as indicated on the one line diagram.

c) Feeder Breakers as indicated on the one line diagram.

2.3 PDC General Construction

- .1 The PDC assembly shall be EEMAC Class 1A, general purpose enclosure with gaskets.
- .2

Voltage	:	600 V
Phases	:	3
Current	:	1200 A
Connection	:	Wye connected - 3 wire from generator (neutral solidly grounded at generator)
Frequency	:	60 Hz
Fault Level	:	Symmetrical PDC "1" = 42 kA minimum
- .3 The PDC shall be front mounted and have floor mounting channel and lifting angles.
- .4 Buswork shall be tin plated aluminum or copper.
- .5 The PDC shall have 600 amp continuous ground bus.
- .6 Bus bracing shall withstand 42,000 amp RMS asymmetrical and short circuit current.
- .7 Vertical sections shall be to dimensions shown on the drawings:
- .8 PDC shall consist of modular vertical sections bolted together to form a rigid, free-standing, dead-front assembly, and shall be designed as to permit future additions or changes of individual units and extensions to the PDC by the user. PDC shall be a complete assembly, with components, units and wiring as specified herein.
- .9 MCC / PDC assemblies shall have units mounted in front of board only. The assembly will be installed "back to back" as shown on the drawings.
- .10 Wiring shall be EEMAC Class 1-B.
- .11 All bus connections shall be front accessible for servicing.
- .12 Provide a 6mm x 50mm horizontal copper ground bus running the length of the PDC. Provide lugs for grounding cables.
- .13 All units, except those too heavy or bulky to manipulate, shall be plug-in.
- .14 Each unit shall be automatically connected through a grounding finger to a vertical ground bus as it is inserted.

- .15 The PDC shall be painted ASA Grey 61.
- .16 Individual compartments shall include barriers so as to minimize the possibility of ionization occurring within a compartment spreading to other compartments.
- .17 There shall be provision for top and bottom entry of cables and conduit and there shall be entry plate for the bottom of each section.
- .18 Control wiring shall be tagged at both ends in accordance with the drawings.
- .19 Plastic tubular wire markers shall be used throughout.
- .20 Control wiring terminals shall be marked in accordance with the drawings.
- .21 Pushbuttons, pilot lights and selector switches etc., shall be heavy duty oiltight. The shall be identified with lamicoid nameplates as specified in Section 16010.

2.4 Detailed PDC Description

- .1 The PDC shall contain the following:
 - .1 Industrial grade PDC sections rated 600V, 1200 amp minimum complete with the following integral components:
 - .1 400 A Manual Transfer Switch to BC Hydro approval. Generator set is Owner Supplied under a different contract.
 - .2 Distribution centre complete with branch circuit breakers as indicated on enclosed drawings.
 - .2 Relays, indicating lights, selector switches.
 - .3 "Smart meter", complete with all required PTs and CTs.
 - .4 Other required items necessary to provide a complete working installation.

2.5 PDC and MCC Construction

- .1 All components shall be mounted in dead front EEMAC 1, metal enclosures and front operated. Units shall be fully wired with all connections and terminals readily accessible from the front. Power and control terminal strips shall be mounted to CEC standards.
- .2 MCC / PDC sections shall be floor mounted and free standing.
- .3 Sections shall be fabricated from rolled flat steel sheets bolted together to form a rigid completely enclosed assembly.

- .4 Each vertical section shall be divided into compartment units as indicated on the drawings and each unit shall have a complete top and bottom steel plate for isolation between units.
- .5 Provide provision in all sections for top and bottom incoming and exiting field cables.
- .6 Provide removable lifting means for moving, loading, unloading and moving assemblies into place on-site with an overhead crane.
- .7 Divide assembly for shipment to site as approved complete with hardware and instructions for re-assembly.

2.6 Seismic Requirements for Components

- .1 The MCC and PDC are to be installed (by others) as a free standing back to back units on the floor of the pump station as shown on the drawings.
- .2 The PDC and MCC components shall be rigidly mounted and fastened internally to the MCC/PDC to withstand seismic forces in accordance with the BC Building Code for equipment with an importance factor of 1.5 for a post disaster structure.
- .3 The MCC/PDC and other sections shall be fitted with seismic angles through bolted to the top of the assembly as indicated on the drawings and as described in Section 16921 (VFD's). The seismic angles shall be connected to floor or wall seismic bracing installed on site by others. Back to back sections shall also be though bolted as indicated on the drawings.
- .3 Fabrication drawings shall be provided with the MCC/PDC bearing the stamp of a Professional Engineer registered in British Columbia with the APEG and indicating that the MCC and PDC have been designed in conformance with the seismic requirements of the BC Building Code and with the specified importance factor.

2.8 Busbars

- .1 Main horizontal and vertical branch busbars shall be three phase high conductivity tin plated aluminum busbars located in separate compartments, extending entire width and height of MCC and PDC, supported on insulators and rated:
 - .1 Main horizontal busbars: 1200 A minimum.
 - .2 Branch vertical busbars: 400 A minimum.

2.9 Power Consumption Meter in PDC

- .1 The power meter supplied shall be a microprocessor controlled and programmable "smart" meter providing the following digital information on the meter readout:
 - .1 KVA, KW, KVar, Power Factor, Amps, Volts, THD, individual harmonic distortion, peak, valley (workable for all phase combinations).
 - .2 Unit shall be capable of Modbus communication via Modbus/TCP or over RS485 port.
 - .3 Meter shall bear CSA Approval sticker.
 - .4 Acceptable Manufacturers: Allen-Bradley, Schneider, Eaton/Cutler Hammer, or approved equal

2.10 Device Mounting

The following devices shall be mounted on the front door of the PDC:

- .1) Manual-off-auto selector switch, OFF-ON selector switches, STATUS indicating lights.
- .2) All devices shall be as indicated on the drawings.
- .3) Smart meter.

2.11 Auxiliary Relays

- .1 Auxiliary relays shall be as shown on the drawings.

2.12 Terminal Blocks

- .1 Terminal blocks shall be as shown on the drawings.

2.13 Control Fuses

- .1 Provide six (6) spare fuses for each type and size of fuse installed. Package spare fuses separately and store in control cabinet.

2.14 Wires

- .1 Power Wiring:
 - .1 Copper conductors with chemically cross linked thermosetting polyethylene (XLPE) 1000V insulation rated RW90: to CSA C22.1-1990 Section 12.
 - .2 Stranded for #12 AWG and larger.
- .2 Instrument Wiring:
 - .1 Stranded soft tinned copper, PVC insulated TWH grade. Colour coded.
 - .2 Multiple twisted shielded pairs/triads, individual aluminium/polyester shield with STC drain wire. Overall PVC jacket.

- .3 Insulation rated at 300V.
- .4 Minimum size #16 AWG

2.15 Nameplates, Labels

- .1 Each unit shall have its own lamicoid service nameplate, black with engraved white lettering, 6 mm high. Wording shall be per approved shop drawing.
- .2 PDC and MCC shall each have a similar main nameplate, except with lettering 10 mm high.
- .3 Overload reset button shall be identified with lamicoid nameplate.
- .4 Internal components in relay panels shall be identified with lamicoid nameplates.
- .5 Refer to Section 16010, Nameplates and Identification.

2.16 Starters / contactors

- .1 All starter / contactor components must be coordinated for the full range of current values from normal running loads to maximum available fault current.
- .2 Starters shall be combination type with circuit breakers with 42,000 amp RMS asymmetrical interrupting capacity with solid state trip
- .3 The external operating handle of the circuit breaker shall be interlocked with the door, so that the handle must be in the off position before the door can be opened. There shall be a facility for padlocking this handle in the open position with up to three padlocks. It shall not be possible to close the disconnect by any means, if the disconnect handle is locked open. When the disconnect is closed, it shall be possible, using a semi secret defeater screw mechanism, to open the starter door, for testing purposes.
- .4 Starters shall have thermal overload relay.
 - a) With elements on three phases
 - b) Which has an N.O./N.C. alarm contact
 - c) Which is ambient compensated
 - d) Which has manual reset.
- .5 Two speed starters shall be complete with 2 mechanically and electrically interlocked contactors and 2 sets of overloads.
- .6 Starters shall be NEMA rated. IEC is not acceptable.
- .7 Starters shall have coils or as shown on the drawings.

- .8 Starters shall be connected to the vertical bus by means of stab connectors plated with the same material as the bus.
- .9 Control power circuit shall be as shown on the drawings
- .10 Control relays, lights, switches, etc., as indicated on the schematic and layout drawings will be mounted in individual starter cubicles.

2.17 VFD's

- .1 See Section 16921 for VFD requirements.

2.18 Feeder Cubicles

- .1 The feeder cubicle components must be coordinated for the full range of current values from normal running loads to maximum available fault current.
- .2 Feeder cubicles shall contain circuit breakers with minimum 42,000 amp RMS symmetrical interrupting capacity with solid state trip.
- .3 The external operating handle of the circuit breaker shall be interlocked with the door, so that the handle must be in the "off" position before the door can be opened. There shall be a facility for padlocking this handle in the open position for up to three padlocks. It shall not be possible to close the disconnect by any means if the disconnect handle is locked open. When the disconnect is closed, it shall be possible using a semi secret defeater screw mechanism, to open the starter door for testing purposes.

2.19 Control Transformer

- .1 Provide a control transformer as indicated on the drawings within the MCC.

2.20 Spare Parts

- .1 Provide 6 spare fuses of each size and type in MCC.
- .2 Provide 6 spare pilot light bulbs.

2.21 Uninterrupted Power Supply (UPS)

See drawings and B.O.M. for details.

PART 3 - EXECUTION

3.1 Execution

- .1 MCC, PDC and VFD shall be constructed to allow the assemblies to be broken into sections small enough to permit bringing it into the building through a standard door.
- .2 See Section 160101 for delivery to site requirements.

END OF SECTION

PART 1 - GENERAL

1.1 Scope of work

- .1 Supply, installation and commissioning of Variable Frequency Drives (VFD'S) in self contained MCC panel sections complete with ventilation and all related components. A total of four (4) Variable Frequency Drive assemblies are required for pumping equipment.
- .2 VFD'S are required to power four (4) new station sewage pumps and to operate pumps over specified variable pumping ranges for each operating pump.
- .3 Field services to program, start up, test, commission and confirm the operation of the VFD'S and other related equipment supplied and requiring setup.

1.2 Standards

- .1 CSA C22.1 latest edition of the Canadian Electrical Code.
- .2 EEMAC M1-7
- .3 IEEE 519-1992
- .4 NEMA MG1
- .5 All cabinets and equipment shall conform and be designed and manufactured in accordance with applicable and current CSA Standards and all Local and Provincial regulations.
- .6 CSA Approval Labels shall be attached to all components **and to the entire VFD assembly.**

1.3 Shop Inspections

- .1 A shop inspection of the VFD assemblies by the Engineer shall be carried out as specified in Section 16010 and other specific sections.

1.4 Power Service at the Pump Station

- .1 Primary electrical power to the site will be from BC Hydro and as described under Division 16 MCC fabrication sections.

1.5 Pumps and Motors

Pump motors will be rated for inverter duty.

- .1 Pump motors are 575 VAC, 3 phase, 1200 rpm (nominal) 75 hp motors with following characteristics:

- | | | |
|----|-------------------------------------|-----------------|
| .1 | Brand: | Baldor |
| .2 | Model: | TEFC |
| .3 | Full Load Amps: | 70 |
| .4 | Starting Amps
(Across the Line): | to be confirmed |
| .5 | Frame: | 405T |
| .6 | Nema Design: | B |
| .7 | Code Letter: | G |

1.6 Documentation to be provided with tender

- .1 Provide two (2) copies of the following:
- .1 Complete catalogue drawings showing arrangement, outline, dimensional details and weight.
 - .2 Complete technical and specification information describing all VFD, filter and reactor components including one copy of users manual. Complete warranty information for all equipment.
 - .3 Delivery dates.

1.7 Documentation to be provided on Award of Contract

- .1 Submit the following information following award of the contract:
- .1 Two (2) copies of the following information for approval within the time period specified following the award of contract.
 - .1 Vendor submissions shall include:
 - a) Schematic diagrams showing complete control circuits and wiring connections;
 - submit within two weeks of award.
 - b) Wiring connection diagram drawings showing each component in correct orientation with each wire identified;
 - submit within two weeks of award.
 - c) Fully detailed and dimensioned shop drawings showing physical panel layout assembly;
 - submit within one week of award.

- d) Modified wiring diagrams with wire numbers changes.
 - submit within two weeks of award.
- e) Complete operating instruction books including users manuals, installation procedures, spare parts lists.
 - submit prior to site installation.
- f) Maintenance manuals shall include component specifications, instructions, part numbers, complete operating manuals, details of guarantees and recommended spare parts list.
 - submit three weeks prior to site commissioning.

PART 2 - PRODUCTS

2.1 Variable Frequency Drives (VFD'S) for Pumps

- .1 The drives shall be microprocessor based solid state AC units, using fully digital sensorless flux vector motor control with IGBT power components. Drives shall have frequency control, V/F characteristic with IR compensation
- .2 Drive Features: VFD's shall provide the following features:
 - a) 24 VDC control voltage;
 - b) Self tuning with comprehensive diagnostics;
 - c) Programmable by front digital display and keypad. Display and keypad shall be remotely mounted in panel door.
 - d) Built in RS-232 port & RS-485 port, capable of Modbus/RTU communication;
 - e) Ethernet port;
 - f) Input signals: 24 VDC and 4-20mA;
 - g) Analog I/O;
 - .1 Minimum 2 analog inputs;
 - .2 Minimum 2 analog outputs;
 - h) Digital I/O;
 - .1 Minimum 5 digital inputs;
 - .2 Minimum 3 form C relay outputs;
 - i) Memory feature to retain programmed settings on loss of input power.
 - J) Power outage ride-thru;
 - k) Auto restart option to allow drive to restart on power failure or other fault and either return with VFD matching the motor rotating speed or VFD to wait until rotation has stopped before starting.
 - l) -20 degrees C to +40 degrees C operating temperature range;
 - m) Adjustable carrier frequency;
 - n) Protection:
 - .1 Timed Motor Overload;

- .2 Undervoltage;
- .3 Overvoltage;
- .4 Instantaneous overcurrent protection;
- .5 Motor pullout;
- .6 Ground fault;
- .7 External fault;
- .8 Short circuit;
- o) Fully programmable PID control;
- p) Adjustments:
 - .1 Minimum and maximum frequency;
 - .2 Switching frequency;
 - .3 Run/stop mode;
 - .4 Analog Frequency setpoint;
 - .5 Frequency rejection points;
 - .6 Current limit;
 - .7 Overload limit;
 - .8 Automatic reset and restart;
 - .9 Acceleration time;
 - .10 Password parameter protection;
 - .11 Three mode PID parameters;
 - .12 Motor overload;
- q) Current Output Regulation:
 - .1 VFD to have adjustable maximum current (amps) output, above which setting the VFD will reduce frequency output (ie pump speed) to avoid pump tripping on overload.
- r) Frequency avoidance settings;

2.2 VFD Size Constraints

- .1 Maximum physical size of VFD enclosures is shown on the drawings and VFD assemblies must fit within enclosure dimensions without exceeding manufacturers recommendations.

2.3 VFD Output Characteristics

- .1 Voltage rise: not to exceed Nema standards for general purpose motors as per Nema MG-1.
- .2 CONTINUOUS VFD OUTPUT RATING: VFD'S supplied under this contract must have a continuous current output rating in rms amps at least **8 % greater than the pump motor VFD nameplate full load current** based on variable torque pump loading at the rated motor voltage.
- .3 INTERMITTENT OUTPUT RATING: intermittent rating shall be 125% of continuous output rating for minimum 60 seconds.

- .4 VFD'S shall accept nominal 600 VAC, plus or minus 10% (540 to 660 VAC), 3 phase 60 Hz power and shall accommodate plus or minus 2% line frequency variations without fault.
- .5 VFD'S shall present a displacement power factor of 0.98 or better to the AC input line under any load or speed.
- .6 VFD efficiency shall be not less than 97% at 60Hz at full load.
- .7 VFD to be programmable in two modes and meet the requirements of 2.3.2 above in either mode
 - constant torque
 - variable torque

2.4 VFD Construction

- .1 VFD'S shall be of modular construction containing printed circuit boards with plug in connections for ease of maintenance.
- .2 VFD'S shall consist of the following major components:
 - .1 Input rectifier section;
 - .2 Phase to phase and phase to ground MOV protection;
 - .3 Smoothing reactor for DC bus;
 - .4 DC bus capacitors;
 - .5 Inverter section;
 - .6 Built in ground fault protection;
 - .7 Remote digital display for programming, operation and diagnostic information.
 - .8 Forced air ventilation adequate for the intended installation arrangement;
 - .9 Line filters (harmonic reduction) and external load filters and reactors and other devices as specified;

2.5 RFI Filters for VFD'S

- .1 RFI filters supplied must be suitable for suppressing radio or other low, medium and high frequency transmissions which may affect electronic components in the pump station control systems or radio and television reception in nearby residential premises.
- .2 RFI filter shall be built in type, or parallel device, Termac or equivalent.

2.6 Harmonic Filters to mitigate line side harmonics

- .1 Filters are required on the line side of each drive unless otherwise indicated to reduce current and voltage harmonics and to protect the VFD'S from line spikes.

- .2 Matrix harmonic filters, each containing inductors and capacitor bank, shall be installed in the same enclosure as the VFD. Capacitor bank requires isolating contactor. Capacitor bank contactor to energize with the VFD “up to speed” output. VFD output to be programmed, so the power factor of the system never exceeds 95%.
- .3 The harmonic filter assembly shall comply with IEEE 519 recommendations for performance and harmonic suppression levels as follows:
 - .1 Current distortion at any given harmonic order less than 8%.
 - .2 Voltage distortion at any given harmonic order less than 5%.
 - .3 Total harmonic distortion less than 10%
- .4 Filters shall be rated at 3% over maximum load.
- .5 Filters shall be as shown on the drawings.
- .6 Filters shall be MTE M8 series

2.7 VFD Output Filters

- .1 Filters required on load side of each drive to limit time rate of voltage rise to NEMA standards, reduce current and voltage distortion, reduce harmonics and motor losses due to heating.
- .2 Filters shall be rated to limit the voltage rise to the motor to less than 500 V/microsecond.
- .3 Output load filters shall limit motor voltage at terminals to 1000 VAC or less.
- .4 Load filters are required to protect the windings of the existing motors from voltage spikes and to minimize the risk of damage to existing motor windings.
- .5 Load filter shall be TCI type “KLC”, MTE “DV” Series, or Hammond “RC” series.

2.8 VFD MCC Sections

- .1 VFD’s shall be supplied in NEMA rated MCC sections of the width and height shown on the drawings. See MCC specifications Section 16920.
- .2 **Forced Ventilation:** Ventilation shall include suitably sized louvers pressed into panel doors during fabrication and shall be equipped with steel insect screens and approved filters for VFD assemblies. **VFD ventilation shall also include** the supply and installation of fans sized for adequate cooling flow for each of the VFD’S installed in the enclosure door assembly and shall be in addition to cooling fans installed in the VFD. Sizing and location of ventilation fan shall be verified by VFD supplier and MCC fabricator to suit site conditions. Fans to be operated by a reverse action thermostat installed in the VFD enclosure.

- .3 The VFD MCC sections with doors shall be thoroughly degreased and cleaned after fabrication. **All surfaces to be primed prior to assembly with chromatic primer. Two finish coats of air dried enamel shall be applied to panel, interior surfaces to be white and exterior surfaces to be colour specified by Owner.**
- .4 The MCC manufacturer shall submit shop drawings for review including method of construction, construction details, dimensioned physical layout, wiring diagrams with all devices, terminals and wire numbers identified, nameplate schedule, including details of their control panel and contents. Include bill of material. Do not proceed with fabrication until approved by the Engineer. All equipment within the VFD sections shall be NEMA 1 or higher rated.
- .5 VFD sections and wiring shall be as indicated on the drawings.
- .6 Identification: Each piece of equipment in VFD sections shall have an identifying lamicoid nameplate. Nameplate schedule and details shall be confirmed with the Engineer prior to fabricating.
- .7 Each end of power and control wire shall be identified with a permanently attached numbered wire marker. Numbering system shall be in accordance with the manufacturer's standard and the contract drawings, and shall be indicated on the manufacturer's shop drawings.
- .8 VFD'S shall be fully wired with all connections and terminals readily accessible from the front. Power and control terminal strips shall be mounted as shown on the drawings.
- .9 Programmable keypad for variable frequency drives shall be door mounted (remote from the VFD'S).
- .10 Provide horizontal wireways, equipped with cable supports, across the top. A bottom wireway shall be provided as indicated on the drawings for power wiring
- .11 Provide vertical wireways for load and control conductors extending full height of vertical sections, and equipped with cable tie supports. All installed wiring shall be fully accessible with doors open and units in place.
- .12 Seismic Bracing for VFD MCC Sections:
 - .1 Provide continuous 2 1/2" x 2 1/2" x 1/4" angles bolted to top of VFD sections as shown on the drawings (for seismic bracing to pump station walls and/floors by others) and matching seismic angles on MCC/PDC sections. Extend angles past end of the end sections as indicated.
 - .2 Angles shall be drilled to accept 3/4" mounting bolts assemblies at 24" centers.

- .3 Angles shall be through bolted to MCC sections using 19 mm bolts, nuts and washers at 24" centers or as indicated on the drawings.

2.9 VFD for Ventilation Fans

- .1 VFD's for ventilation fans shall be in general conformance with the VFD pump specifications and shall be fitted with a programmable keypad on the external front face of the MCC section in which they are installed.
- .2 See drawings and specifications for MCC layout and location of ventilation VFD's.

2.10 Acceptable Variable Frequency Drive Products

- .1 MGI (Mitsubishi);
- .2 ABB;
- .3 Toshiba;
- .4 Alstrom;
- .5 Fluxmaster;
- .6 Yaskawa;
- .7 Allen-Bradley;
- .8 Schneider /Square D

VFD's must fit within space constraints of VFD enclosures to be acceptable.

PART 3 - EXECUTION

3.1 Installation

- .1 Install VFD assemblies and sections as indicated on the drawings and in coordination with other MCC sections and components.

3.2 Start-Up Services (See also Section 16010)

- .1 Following fabrication and installation at the site, the contractor shall provide start up services for **VFD'S** including:
 - .1 Inspection of installed installation to confirm VFDs, reactors, filters and other equipment is installed in conformance with the manufacturers recommendations and written confirmation that the installation has been inspected and is acceptable and all warranties are in place and in effect.
 - .2 Setting and recording of all VFD parameters. Records to be included in the O&M manuals.
 - .3 Setting of VFD PID set-points;

- .4 Providing explanation and demonstration and brief tutorial on setting and changing VFD parameters.
- .5 Confirming characteristics of VFD output current and voltage waveform, determining harmonic content of VFD waveform and maximum motor terminal voltage under full load as well as voltage rise time using oscilloscope and other required test equipment.
- .6 Confirmation that VFD ventilation and cooling air flows are correct and operating satisfactorily. Confirmation shall include taking air temperature measurements (in the pump station and across the VFD) while the VFD's are under full load.
- .7 VFD supplier to program VFDs in the shop and as directed by the Engineer during the shop commissioning.

3.3 Testing and Commissioning Procedures

- .1 Except where specifically noted otherwise, the Contractor shall be responsible for testing, commissioning, programming, calibration and adjustment of all VFD'S and other related equipment supplied under this contract as necessary or required to provide a working pump station installation. The Engineer will provide details specifying testing procedures prior to the start of testing but testing shall be carried out to confirm the correct operation of VFD'S over the normal operational conditions of the pump station including the starting and stopping of all pump units over the programmed sequence of pump operation. The Engineer shall be the sole judge in determining if a device or piece of equipment is operating correctly. The Contractor shall abide by any decisions or instructions issued by the Engineer concerning the correct operation of devices or equipment.
- .2 The Contractor shall complete initial testing and commissioning of all systems and components to confirm the adequacy of all items. When all items are operating satisfactorily, the Contractor shall then conduct the following tests **in the presence of the Engineer**:
 - .1 Correct functioning of the VFD and pump over a speed range between 30 to 60 Hz with VFD'S maintaining a constant discharge flow rate using speed control and flow meter.
 - .2 Confirming output characteristics of VFD current and voltage waveform as required under start-up services.
- .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project including:
 - .1 Provide and install test oscilloscope, PT'S, CT'S and other equipment to clearly show input and output waveform of each drive under varying load conditions.
 - .2 Provide two (2) analog loop calibrators capable of simulating and measuring 4-20mA signals.

- .3 As-built drawings to be available for the test.
- .4 Submit test results for Engineer's review.
- .5 Engineer will:
 - a) Witness the proper operation of the systems
 - b) Inspect the installation.
 - c) Give final approval for the installation.

3.4 Earthquake Restraint

- .1 Provide seismic restraint angles and anchor bolt fastening to VFD and MCC/PDC sections as indicted on the drawings.
- .2 Seismic restraint drawings stamped by a P.Eng registered with the APEGBC shall be provided for all electrical equipment showing details of seismic restraint systems.

3.5 Drive Supplier Responsibility

- .1 The VFD supplier is responsible for following manufacturer's recommendation for installation, including ventilation, grounding and conductor isolation.
- .2 All drives shall be of the same manufacturer. Provide a letter of certification stating that all the requirements had been met.
- .3 Supplier to review all configuration parameters with the Engineer prior to startup. Minimum parameter list:
 - carrier frequency
 - V/f pattern
 - Maximum and minimum output frequencies
 - Overload
 - Acceleration and deceleration
 - Torque boosting parameters (voltage, current and rate of rise)

Supplier shall be responsible for all the programming to the satisfaction of the Engineer. Drives to be fully capable of AUTO restart with any alarms cleared, subsequent to a power outage.

END OF SECTION

The following Drawings, bound separately, form part of the Tender Documents and are available for pickup at the Purchasing Services Office at the address listed on the front cover:

Item	Drawing Description	Drawing Number	Revision
1	City of Vancouver Kitsilano Pump Station Upgrade Drawing List	Cover Sheet	P3
2	Kitsilano Pump Station – MCC Single Line Diagram Conduit Tables and MCC Layout	1972-E-SHT 1	P3
3	Kitsilano Pump Station – MCC Wiring Schematic Diagrams 120VAC & 24VDC Distribution	1972-E-SHT 2	P3
4	Kitsilano Pump Station – MCC Common Controls PLC I/O	1972-E-SHT 3	P3
5	Kitsilano Pump Station – MCC Pump Controls Pump P1, P2, P3, P4	1972-E-SHT 4	P3
6	Kitsilano Pump Station – MCC Primary PLC I/O Layout	1972-E-SHT 5	P3
7	Kitsilano Pump Station – MCC Secondary PLC I/O Layout	1972-E-SHT 6	P3
8	Kitsilano Pump Station – MCC Control Panel Build of Materials	1972-E-SHT 7	P3
9	Kitsilano Pump Station – MCC Pump Station Upgrades Exiting Plans & Section	1972-200	P1
10	Kitsilano Pump Station – MCC Pump Station Upgrades Prop Plan & Section Electrical	1972-201	P1
11	Kitsilano Pump Station – MCC Pump Station Upgrades Building Piping	1972-301	P1



CITY OF
VANCOUVER

**CERTIFICATE OF EXISTING INSURANCE
TO BE COMPLETED AND APPENDED TO THE PROPOSAL/TENDER**

Section 2 through 8 – to be completed and executed by the Insurer or its Authorized Representative

1. **THIS CERTIFICATE IS ISSUED TO:** City of Vancouver, 453 W 12th Avenue, Vancouver, BC, V5Y 1V4
and certifies that the insurance policy (policies) as listed herein has/have been issued to the Named Insured and is/are in full force and effect.
2. **NAMED INSURED** *(must be the same name as the proponent/bidder and is either an individual or a legally incorporated company)*

BUSINESS TRADE NAME or DOING BUSINESS AS

BUSINESS ADDRESS

DESCRIPTION OF OPERATION

3. PROPERTY INSURANCE (All Risks Coverage including Earthquake and Flood)

INSURER _____	Insured Values (Replacement Cost) -
TYPE OF COVERAGE _____	Building and Tenants' Improvements \$ _____
POLICY NUMBER _____	Contents and Equipment \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____

4. COMMERCIAL GENERAL LIABILITY INSURANCE (Occurrence Form)

Including the following extensions:	INSURER _____
✓ Personal Injury	POLICY NUMBER _____
✓ Property Damage including Loss of Use	POLICY PERIOD From _____ to _____
✓ Products and Completed Operations	Limits of Liability (Bodily Injury and Property Damage Inclusive) -
✓ Cross Liability or Severability of Interest	Per Occurrence \$ _____
✓ Employees as Additional Insureds	Aggregate \$ _____
✓ Blanket Contractual Liability	All Risk Tenants' Legal Liability \$ _____
✓ Non-Owned Auto Liability	Deductible Per Occurrence \$ _____

5. AUTOMOBILE LIABILITY INSURANCE for operation of owned and/or leased vehicles

INSURER _____	Limits of Liability -
POLICY NUMBER _____	Combined Single Limit \$ _____
POLICY PERIOD From _____ to _____	<i>If vehicles are insured by ICBC, complete and provide Form APV-47.</i>

6. ☐ UMBRELLA OR ☐ EXCESS LIABILITY INSURANCE **Limits of Liability (Bodily Injury and Property Damage Inclusive) -**

INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Self-Insured Retention \$ _____

7. PROFESSIONAL LIABILITY INSURANCE

INSURER _____	Limits of Liability
POLICY NUMBER _____	Per Occurrence/Claim \$ _____
POLICY PERIOD From _____ to _____	Aggregate \$ _____
	Deductible Per Occurrence/Claim \$ _____

If the policy is in a "CLAIMS MADE" form, please specify the applicable Retroactive Date: _____

8. OTHER INSURANCE

TYPE OF INSURANCE _____	Limits of Liability
INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____
TYPE OF INSURANCE _____	Limits of Liability
INSURER _____	Per Occurrence \$ _____
POLICY NUMBER _____	Aggregate \$ _____
POLICY PERIOD From _____ to _____	Deductible Per Loss \$ _____

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE

PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER

Dated _____

Section 8 b) – City staff to select the required # of days Written Notice before sending the certificate out for completion
Section 2 through 8 – to be completed and executed by the Insurer or its Authorized Representative

1. **THIS CERTIFICATE IS ISSUED TO:** City of Vancouver, 453 W 12th Avenue, Vancouver, BC, V5Y 1V4
and certifies that the insurance policies as listed herein have been issued to the Named Insured(s) and are in full force and effect as of the effective date of the agreement described below.

2. **NAMED INSURED:** *[must be the same name as the Permittee/Licensee or Party(ies) to Contract and is/are either an individual(s) or a legally incorporated company(ies)]*

MAILING ADDRESS:

LOCATION ADDRESS:

DESCRIPTION OF OPERATION, CONTRACT, AGREEMENT, LEASE, PERMIT OR LICENSE:

3. **PROPERTY INSURANCE** naming the City of Vancouver as a Named Insured and/or Loss Payee with respect to its interests and shall contain a waiver clause in favour of the City of Vancouver.

(All Risks Coverage including Earthquake and Flood)

INSURED VALUES: (Replacement Cost)

INSURER: _____

Building and Tenants' Improvements: \$ _____

TYPE OF COVERAGE: _____

Contents and Equipment: \$ _____

POLICY NUMBER: _____

Deductible Per Loss: \$ _____

POLICY PERIOD: From _____ to _____

4. **COMMERCIAL GENERAL LIABILITY INSURANCE (Occurrence Form)**

Including the following extensions:

LIMITS OF LIABILITY: (Bodily Injury and Property Damage Inclusive)

✓ Personal Injury

Per Occurrence: \$ _____

✓ Products and Completed Operations

Aggregate: \$ _____

✓ Cross Liability or Severability of Interest

All Risk Tenants' Legal Liability: \$ _____

✓ Employees as Additional Insureds

✓ Blanket Contractual Liability

✓ Non-Owned Auto Liability

INSURER: _____

Deductible Per Occurrence: \$ _____

POLICY NUMBER: _____

POLICY PERIOD: From _____ to _____

5. **AUTOMOBILE LIABILITY INSURANCE** for operation of owned and/or leased vehicles

INSURER: _____

LIMITS OF LIABILITY:

POLICY NUMBER: _____

Combined Single Limit: \$ _____

POLICY PERIOD: From _____ to _____

If vehicles are insured by ICBC, complete and provide Form APV-47.

6. ☐ **UMBRELLA OR** ☐ **EXCESS LIABILITY INSURANCE**

LIMITS OF LIABILITY: (Bodily Injury and Property Damage Inclusive)

INSURER: _____

Per Occurrence: \$ _____

POLICY NUMBER: _____

Aggregate: \$ _____

POLICY PERIOD: From _____ to _____

Self-Insured Retention: \$ _____

7. **OTHER INSURANCE** (e.g. Boiler & Machinery, Business Interruption, Crime, etc.) – Please specify Name of Insurer(s), Policy Number, Policy Period, and Limit

8. **POLICY PROVISIONS:**

Where required by the governing contract, agreement, lease, permit or license, it is understood and agreed that:

a) *The City of Vancouver, its officials, officers, employees, servants and agents have been added as Additional Insureds with respect to liability arising out of the operation of the Named Insured pursuant to the governing contract, agreement, lease, permit or license;*

b) *SIXTY (60) days written notice of cancellation or material change resulting in reduction of coverage with respect to any of the policies listed herein, either in part or in whole, will be given by the Insurer(s) to the Holder of this Certificate; the exception is cancellation for non-payment of premiums in which case the applicable statutory conditions will apply;*

c) *The insurance policy (policies) listed herein shall be primary with respect to all claims arising out of the operation of the Named Insured. Any insurance or self-insurance maintained by the City of Vancouver shall be in excess of this insurance and shall not contribute to it.*

SIGNED BY THE INSURER OR ITS AUTHORIZED REPRESENTATIVE

PRINT NAME OF INSURER OR ITS AUTHORIZED REPRESENTATIVE, ADDRESS AND PHONE NUMBER Dated: _____