CITY OF RICHMOND
INVITATION TO TENDER

Contract T.3289

Contract: Horseshoe Slough Pump Station Inlet Upgrade

The City of Richmond invites tenders for construction work at the above-mentioned locations. Work under the Contract generally comprises a comprehensive renovation of the existing inlet structure at the Horseshoe Slough Drainage Pump Station.

Work generally entails the following:

- Removal of existing reinforced concrete inlet structure and intake trash screens
- Construction of expanded inlet structure

The *Contract Documents* are available on or after June 26, 2008 during normal business hours at Front of House of the Richmond City Hall at:

6911 No. 3 Road, Richmond, BC, V6Y 2C1

on payment of a **non-refundable** amount of $50.00 including GST payable to:

City of Richmond

The *Contract Documents* are available for viewing at:

Front of House, Richmond City Hall, 6911 No. 3 Road, Richmond and Vancouver Regional Construction Association, 3636 East 4th Avenue, Vancouver.

Tenders are scheduled to close at:

Tender Closing Time:	3:00 PM local time
Tender Closing Date:	July 17, 2008 and will be opened publicly immediately thereafter in Richmond City Hall
Tender Submission Address:	Manager – Purchasing & Risk Front of House, Richmond City Hall 6911 No. 3 Road, Richmond, BC, V6Y 2C1

A valid tender consists of a submission delivered on time complete with the required Bid Bond, Undertaking of Surety and Undertaking of Liability Insurance.

The lowest or any tender will not necessarily be accepted.

Manager – Purchasing & Risk

City of Richmond
6911 No. 3 Road, Richmond, BC V6Y 2C1
Telephone 604-276-4000
www.richmond.ca

July 11, 2008
File: T.3289

Business & Financial Services Department
Telephone: 604-276-4219
Fax: 604-276-4162

TO THOSE WHO HAVE RECEIVED COPIES OF T.3289

Dear Sir/Madam:

Re: Contract T.3289
Addendum No. 1
Horseshoe Slough Pump Station Inlet Upgrade

This addendum forms part of the Contract Documents and shall be read, interpreted and coordinated with all other parts. The costs of all work contained herein shall be included in the Contract Price. The following revisions supersede the information contained in the original Contract Document to the extent referenced and shall become part thereof.

Tenderers shall acknowledge receipt of this addendum by:

Inserting its number and date where provided for on the Form of Tender.

1. Please note the tender closing date has been extended. Therefore, in the section CITY OF RICHMOND - INVITATION TO TENDER under Tender Closing Date please remove the following:

   "July 17, 2008 and will be opened publicly immediately thereafter in Richmond City Hall"

   and replace with:

   "July 24, 2008 and will be opened publicly immediately thereafter in Richmond City Hall"

   And, in SECTION A - INSTRUCTIONS TO TENDERERS, page A-4, under Submissions of Tenders 3.1 please remove the following:

   "Tender Closing Date: July 15, 2008"

RICHMOND
Island City, by Nature

and replace with:

"Tender Closing Date: July 24, 2008"

2. Please find included with this addendum, a report prepared by Triton Environmental Ltd. to be inserted into SECTION H - GROUND WATER TEST RESULTS AND ANALYSES.

3. In SECTION A - INSTRUCTIONS TO TENDERERS, page A-3, under Introduction 1.1 please remove the following:

   "The Contract is generally for the following work:

   - Removal of existing reinforced concrete inlet structure and intake screens
   - Construction of expanded inlet structure
   - Install City Supplied inlet screens"

   and replace with:

   "The Contract is generally for the following work:

   - Removal of existing reinforced concrete inlet structure and intake screens
   - Construction of expanded inlet structure"

4. In SECTION B - TENDER SUBMISSION DOCUMENTS, FORM OF TENDER, Appendix 1 - SCHEDULE OF QUANTITIES AND PRICES, page B-11, delete Item No. 3.4 - Install City Supplied intake screens. Attached is a revised schedule for ITEM NO. 3 - NEW INLET STRUCTURE.

5. In SECTION D - DOCUMENTS SPECIFIC TO THIS CONTRACT, Measurement of and Payment for Work, page D-56, remove the following:

   "Install City supplied intake screens - Item 3.4"

   This item includes all the Contractor's costs for labour and equipment associated with the installation of the City supplied intake screens for the expanded inlet structure.

   Payment for this item will be made at the tendered lump sum price in the Schedule of Quantities and Prices.

Yours truly,

Kerry Lynne Gillis FOR:

Sumita Dosanjh
Buyer II - Contracting Specialist

KG:klg

T.3289 – Horseshoe Slough Pump Station Inlet Upgrade SCHEDULE OF QUANTITIES AND PRICES					
ITEM NO.	**DESCRIPTION**	**UNIT**	**EST. QTYS.**	**UNIT PRICE ($)**	**TOTAL AMT. ($)**
3.	NEW INLET STRUCTURE				
3.1	Excavation and Backfill	Lump Sum			
3.2	Construct Cast-In-Place Concrete Inlet Structure	Lump Sum			
3.3	Over-excavation and Backfill (Provisional)	m^3	60		
TOTAL FOR NEW INLET STRUCTURE ITEMS – ITEM 3 **(Carry forward to Tender Summary)**					$

8971 Beckwith Road,
Richmond, BC
V6X 1C4

July 11, 2008

Mr. Anthony Fu, Project Manager
Engineering and Public Works
City of Richmond
6911 No.3 Road
Richmond, BC V6Y 2C1

1.0 INTRODUCTION

Triton Environmental Consultants Ltd (Triton) and Levelton Consultants Ltd (Levelton) were retained by the City of Richmond to conduct ground water sampling at Horseshoe Slough (11551 Dike Rd). The main purpose of the sampling program was to establish background levels of metals (particularly iron) in groundwater adjacent to the working area for the upcoming Horseshoe Slough pump station inlet upgrade.

The upgrade will require some groundwater collection, treatment and discharge to sanitary sewer, storm sewer or open waterbody. Discharges to sanitary sewer are regulated by the GVSD&D Sewer Use Bylaw (2007). Discharges to storm sewer and open waterbodies are guided by the BC Approved and Working Water Quality Guidelines (BCWQG) (updated 2006; new iron guidelines 2008).

For planning purposes, the City of Richmond needed to characterize concentrations of total and dissolved metals in groundwater, to identify likely requirements for groundwater treatment and the appropriate route of discharge (e.g. sanitary versus storm sewer). This document summarizes groundwater sampling completed in the Horseshoe Slough working area the week of 16 June 2008, and presents strategies for groundwater management in the context of sampling results.

2.0 SAMPLE COLLECTION

A monitoring well was installed at Woodward Landing (11551 Dike Rd) on the morning of June 16 2008. Levelton collected hardness, total and dissolved metals and polycyclic aromatic hydrocarbons (PAH) samples from the well on June 18 2008. Hardness, total and dissolved metals samples were also collected from Horseshoe Slough for comparison purposes. All samples were submitted to CARO Analytical Services (CARO) in Richmond, BC.

3.0 RESULTS

Sampling results are presented in Tables 1 through 3 and include comparisons with the following criteria and guidelines:

- SEWER USE BYLAW NO. 299, 2007, Schedule B Restricted Wastes.
- BCWQG for the protection of freshwater aquatic life (2006; new iron guidelines 2008).
- Environmental Management Act, Contaminated Site Regulation (CSR, 2007) Schedule 6, Generic Numerical Water Standards.

3.1 Detection limits for total and dissolved metals

Low detection limits could not be used for the total and dissolved metals samples. High levels of sodium and other parameters can cause interferences in the samples. CARO staff indicated they could not achieve lower detection limits on the samples provided. In some cases, (arsenic, lithium, silver and others) the detection limits were higher than the BCWQG. It would be prudent to repeat groundwater metals sampling closer to the time of construction.

3.2 Total metals in groundwater

With the exception of iron and manganese, the detectable total metals concentrations were below the GVSDD Schedule B Restricted Wastes criteria. Exceedences of the BCWQG were noted for boron, iron, manganese and copper. Note the water hardness for Horseshoe Slough was used to identify potential exceedences of the BCWQG.

Table 1. Summary of total metals data (June 2008).

Parameters (total metals) (mg/L)	Horseshoe Slough groundwater	GVSDD Restricted Wastes (2007) (mg/L)	BC Approved / Working Water Quality Guidelines (2006) protection of aquatic life (mg/L)	Contaminated Sites Regulation (2007) aquatic life criteria (mg/L)
Aluminum	9.10	50	-	-
Antimony	<0.03	-	0.02	0.2
Arsenic	<0.05	1	0.005	0.05

Table 1. Summary of total metals data (June 2008), continued.

Parameters (total metals) (mg/L)	Horseshoe Slough groundwater	GVSDD Restricted Wastes (2007) (mg/L)	BC Approved / Working Water Quality Guidelines (2006) protection of aquatic life (mg/L)	Contaminated Sites Regulation (2007) aquatic life criteria (mg/L)
Barium	0.475	-	5	5 to 10
Beryllium	<0.02	-	0.0053	0.053
Boron	***1.6***	***50***	***1.2***	***50***
Cadmium	<0.001	0.2	>0.06	>0.6
Chromium	<0.05	4	0.001 to 0.08	0.01
Cobalt	0.0059	5	0.11	0.04
Copper	***0.0563***	***2***	***0.041***	0.09
Iron	***26.3***	***10***	***1.0***	***-***
Lead	<0.01	1	>0.33	0.160
Lithium	<0.02	-	0.014	-
Magnesium	649	-	-	-
Calcium	358	-	-	-
Manganese	***7.33***	***5***	***5.09***	***-***
Mercury	<0.003	0.05	0.0001	0.001
Molybdenum	<0.01	1	2	10
Nickel	<0.05	2	0.150	1.5
Selenium	<0.05	1	0.002	0.01
Silver	<0.004	1	0.003	0.015
Sodium	4,710	-	-	-
Thallium	<0.005	-	0.002	0.003
Titanium	<1.0	-	2	1
Uranium	<0.005	-	0.3	3
Vanadium	<0.1	-	0.006 to 0.02	-
Zinc	<0.3	3	0.265	>2.4

3.3 Dissolved metals in groundwater

There are no criteria for dissolved metals under the GVSDD SEWER USE BYLAW NO. 299 or the CSR. However, the dissolved iron and manganese concentrations exceeded the total iron and manganese criteria under Schedule B of the bylaw. Dissolved iron concentrations exceeded the BC Approved Water Quality guideline whereas dissolved aluminum was below the guideline. A summary of dissolved metals concentrations is provided in Table 2.

Table 2. Summary of dissolved metals (June 2008).

Parameter (dissolved metals) (mg/L)	Horseshoe Slough groundwater	Horseshoe Slough groundwater (Duplicate)	BC Approved / Working Water Quality Guidelines (2006) protection of aquatic life (mg/L)
Aluminum	<0.05	<0.05	0.1
Antimony	<0.003	<0.003	-
Arsenic	<0.05	<0.05	-
Barium	0.351	0.345	-
Beryllium	<0.002	<0.002	-
Boron	1.42	1.43	-
Cadmium	<0.0001	<0.0001	-
Chromium	0.005	0.005	-
Cobalt	0.0009	0.001	-
Copper	0.0528	0.051	-
Iron	***14.3***	***13.7***	***0.35***
Lead	<0.001	<0.001	-
Lithium	0.0098	0.01	-
Magnesium	559	569	-
Calcium	312	312	-
Manganese	6.3	6.18	-
Mercury	<0.0003	<0.0003	-
Molybdenum	0.003	0.0032	-
Nickel	0.009	0.01	-
Selenium	0.0159	0.009	-
Silver	0.0004	0.0004	-
Sodium	4,690	4720	-
Strontium	4.21	4.18	-
Thallium	<0.0005	<0.0005	-
Titanium	<0.1	<0.1	-
Uranium	<0.005	<0.005	-
Vanadium	<0.01	<0.01	-
Zinc	0.03	0.03	-

3.4 Hydrocarbons in groundwater

PAH were not detected in the groundwater sample collected from the monitoring well. A summary of the PAH data is provided in Table 3.

Table 3. Summary of PAH and EPH data (3 October 2007).

Parameter (ug/L)	Horseshoe slough groundwater (ug/L)	GVRD Schedule B Restricted Wastes (ug/L)	BC Approved / Working Water Quality Guidelines (August 2006) (ug/L)	CSR criteria (2007) (ug/L)
Acenaphthene	<0.05	-	6 (chronic)	60
Acenaphthylene	<0.05	-		
Acridine	<0.05	-	3 (chronic)	0.5
Anthracene	<0.05	-	4 (chronic)	1
Benzo (a) anthracene	<0.05	-	0.1 chronic	1
Benzo (a) pyrene	<0.01	-	0.01 (chronic)	0.1
Benzo (b) fluoranthene	<0.05	-	-	
Benzo (g,h,i) perylene	<0.05	-	-	
Benzo (k) fluoranthene	<0.05	-	-	
Chrysene	<0.05	-	-	1
Dibenz (a) anthracene	<0.05	-	-	-
Fluoranthene	<0.05	-	4	2
Fluorene	<0.05	-	12	120
Indeno (1,2,3c-d) pyrene	<0.05	-	-	-
Naphthalene	<0.05	-	1	10
Phenanthrene	<0.05	-	0.3	3
Pyrene	<0.05	-	-	0.2
Quinoline	<0.05	-	3.4	34
Total PAH	<0.05	50	-	-

3.5 Total and dissolved metals in Horseshoe Slough

Total and dissolved iron in Horseshoe Slough exceeded the BC Approved water quality guidelines. Summaries of the total and dissolved metals data are provided in Tables 4 and 5.

Table 4. Summary of total metals in Horseshoe Slough (June 2008).

Parameters (total metals) (mg/L)	Horseshoe Slough	GVSDD Restricted Wastes (2007) (mg/L)	BC Approved / Working Water Quality Guidelines (2006) protection of aquatic life (mg/L)	Contaminated Sites Regulation (2007) aquatic life criteria (mg/L)
Aluminum	0.873	50	-	-
Antimony	<0.03	-	0.02	0.2
Arsenic	<0.05	1	0.005	0.05
Barium	0.097	-	5	5 to 10
Beryllium	<0.02	-	0.0053	0.053
Boron	<0.2	50	1.2	50
Cadmium	<0.001	0.2	>0.06	>0.6
Chromium	<0.05	4	0.001 to 0.08	0.01
Cobalt	<0.005	5	0.11	0.04
Copper	<0.03	2	0.041	0.09
Iron	***16.9***	***10***	***1.0***	***-***
Lead	<0.01	1	>0.33	0.160
Lithium	<0.02	-	0.014	-
Magnesium	56.6	-	-	-
Calcium	72.3	-	-	-
Manganese	1.35	5	5.09	-
Mercury	<0.003	0.05	0.0001	0.001
Molybdenum	<0.01	1	2	10
Nickel	<0.05	2	0.150	1.5
Selenium	<0.05	1	0.002	0.01
Silver	<0.004	1	0.003	0.015
Sodium	278	-	-	-
Thallium	<0.005	-	0.002	0.003
Titanium	<1.0	-	2	1
Uranium	<0.005	-	0.3	3
Vanadium	<0.1	-	0.006 to 0.02	-
Zinc	<0.3	3	0.265	>2.4

Table 5. Summary of dissolved metal data from Horseshoe Slough (June 2008).

Parameter (dissolved metals) (mg/L)	Horseshoe Slough	BC Approved / Working Water Quality Guidelines (2006) protection of aquatic life (mg/L)
Aluminum	<0.05	0.1
Antimony	<0.003	-
Arsenic	<0.05	-
Barium	0.099	-
Beryllium	<0.002	-
Boron	0.186	-
Cadmium	<0.0001	-
Chromium	<0.005	-
Cobalt	0.0006	-
Copper	0.0031	-
Iron	***9.8***	***0.35***
Lead	<0.001	-
Lithium	0.0053	-
Magnesium	66.1	-
Calcium	62.1	-
Manganese	1.59	-
Mercury	<0.0003	-
Molybdenum	0.0011	-
Nickel	<0.005	-
Selenium	<0.005	-
Silver	<0.0004	-
Sodium	405	-
Strontium	0.540	-
Thallium	<0.0005	-
Titanium	<0.1	-
Uranium	<0.005	-
Vanadium	<0.01	-
Zinc	<0.03	-

4.0 DISCHARGE AND TREATMENT OPTIONS

4.1 Discharge strategies

As expected total iron levels were above the GVSDD sewer use bylaw criteria. In addition, total and dissolved iron, total boron, total manganese and total copper were above the BC Approved Water quality guidelines. We were surprised to see the total manganese levels exceeded the GVSDD sewer use criteria. These results confirm treatment will be required before discharge to any receiving environment. Depending on the method of groundwater collection and discharge, and the flow rates of the discharge, we expect Contractors will have to implement one of the following options for dealing with groundwater from the Horseshoe Slough working area:

- Treating the water and discharging to sanitary sewer, which will require a sanitary sewer discharge permit and some coordination with the City of Richmond's engineering department to assess the capacity of the receiving sanitary sewer. If Contractors pursue a sanitary sewer discharge permit, additional sampling will be required (pH, TSS, $BOD_{5,}$ sulphate, BTEX and possibly other parameters).

- Treating the water and discharging to storm sewer, which will require the treatment system to reduce all metals concentrations, including iron, down to the BCWQG levels (as indicated by the City of Richmond). The background approach to storm sewer discharge will not be acceptable to the City of Richmond. This option will likely require capacity analysis on the storm sewer system. Water samples for hardness will have to be collected from the storm sewer to determine the appropriate guideline levels for cadmium, copper, lead, nickel, silver and zinc. Given the high levels of some metals in the groundwater this may be a challenging option to implement successfully.

- Treating the water and discharging to Horseshoe Slough, which will require additional sampling in Horseshoe Slough (for water hardness) and strict compliance with the BCWQG. The background approach to Horseshoe Slough discharge will not be acceptable to the City of Richmond. Given the high levels of some metals in the groundwater this may also be a challenging option to implement successfully.

- Treating and discharging groundwater to multiple receiving environments (e.g. storm sewer and the sanitary sewer). Once again, discharge to storm sewer would require strict compliance with the BCWQG.

Installing a well point dewatering system will keep the working area dry, but will also mobilize high concentrations of iron in the discharge. This will likely require more complex and expensive treatment systems. An alternative would be to excavate one or more sumps, install pump intakes and backfill with river gravels or washed clear crush. In this case, intakes should be buried and surrounded with at least 75 cm of rock on all sides. Using this method, there may be some potential for introducing particulate matter into the discharge.

4.1.1. Discharge to ground

As part of this evaluation we considered discharge of treated water direct to ground. The province has proposed new sodium and chloride soil criteria for the Contaminated Sites Regulation (CSR). Localized, elevated sodium levels in soils may occur as a result of discharge to ground, possibly resulting in exceedences of the proposed 190 mg/kg (ppm) and 200 mg/kg (ppm) criteria for protection against toxicity to soil invertebrates and plants. We do not know what the chloride levels in groundwater are at this time, but suspect they are also high given the tidal influence on groundwater. Discharges to ground may also result in localized exceedences of the proposed chloride in soils criteria of 350 mg/kg to 370 mg/kg. As a result, we do not recommend ongoing direct discharge to ground.

4.2 Treatment options

Two remediation contractors have responded to our requests for information. The following descriptions of treatment systems are general and do not necessarily reflect the exact system requirements for the Horseshoe Slough working area. Those requirements would be determined in the field and upon further discussion of groundwater collection, treatment and discharge strategies. The remediation contractors identified the following:

- Iron (and other metals) reduction with hydrogen peroxide and coagulant injection, followed by physical settling of particulates. The same process works for reducing other particulate metals and Sumas Environmental Services Inc (Sumas) has indicated it should work on the high manganese concentrations.

- Filtration and flocculent to a well point system, including flocculent contact vessels, flocculants APS 712 Silt Stop and APS 703d#3 Floc Log®[1], 15,000 gallon capacity weir tanks with jute cloth separating individual cells in the tanks, aeration systems and a sock filter for polishing. This system is provided by Canadian Dewatering and will be used for the first time in the City of Richmond in July 2008.

If lower flow rates can be used at the Horseshoe Slough working area, the Sumas treatment system could be based on an 8 ft x8 ft chemical injection tank and a 20 ft x 8 ft Wetsep treatment tank which actively settles coagulated metals with a vortex system. The Wetsep can handle flows of up to roughly 120 GPM (7.6 L/s) and it is possible two Wetseps may be available by the time of construction. Note if Contractors choose to hire Sumas for the treatment program, they would have to meet with or contact Sumas well in advance of the project to discuss available groundwater data, anticipated flow rates and treatment requirements.

Because of our reporting schedule for this project, we were unable to connect with Canadian Dewatering to discuss what their system sizing requirements may be, but we understand their system can be scaled depending on flow rates. The Canadian Dewatering representative indicated the system they are currently setting up could manage roughly 20 L/s (317 GPM) of flow from a well point system. Should the Contractor choose to hire Canadian Dewatering for the treatment program, we recommend they meet with or contact them well in advance of the project to discuss available groundwater data, anticipated flow rates and treatment requirements.

The higher the flow rate, the more physical space would likely be required for settling. Multiple weir tanks have been used with limited success at other sites. The best approach would be to collect and discharge treated groundwater at the lowest possible flow rates.

5.0 RECOMMENDATIONS AND CONCLUSIONS

We recommend the successful Contractor coordinate with the environmental monitor and the treatment contractor, well ahead of the projected start date to discuss dewatering methods, flow rates, treatment requirements and discharge options. Although Contractors will most likely want to use a well point system, we recommend they consider alternatives (e.g. buried pumps).

[1] MSDS are attached to the end of this document.

If they must use a well point system, then it may be advisable to treat and discharge to sanitary sewer. The well point systems can drive up the iron levels quickly, particularly if flow rates are increased. In this scenario, discharge to sanitary sewer would be the least risk approach to managing groundwater from the working area. In the event of a system failure, discharge to sanitary would not pose a risk to aquatic systems like Horseshoe Slough.

If the contractor does not use a well point system, and discharges at lower flow rates, then discharge to Horseshoe Slough or the storm sewer may be an option. However, the treated discharge must comply with the BC Approved Water Quality Guidelines. This may be challenging given the high metals concentrations in the groundwater and could be further complicated by increased flow rates during construction. Comparatively speaking, dumping treated groundwater to sanitary sewer would pose less risk overall than dumping treated discharge to storm sewer or Horseshoe Slough.

In the case of discharge to sanitary sewer, storm sewer or Horseshoe Slough, the City of Richmond and or the GVSDD may require some proof the treatment will function as intended prior to discharge.

If you have any questions or comments about this letter, please feel free to contact me at 604-279-2093 or kgraf@triton-env.com.

Sincerely,

Karla Graf
Project Manager

6.0 REFERENCES

Environmental Management Act: Contaminated Sites Regulation (2007)
http://www.qp.gov.bc.ca/statreg/reg/E/EnvMgmt/EnvMgmt375_96/375_96.htm

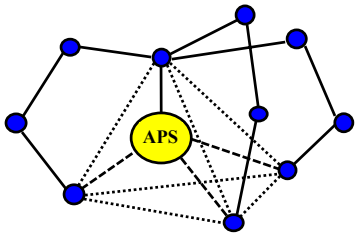
GVSDD (2007) GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT. SEWER USE BYLAW NO. 299, 2007
http://www.gvrd.bc.ca/sewerage/pdf/SUB299.pdf

Ministry of Environment (MOE) (2006). British Columbia Approved Water Quality Guidelines 2006 Edition. Updated August 2006.
http://www.env.gov.bc.ca/wat/wq/BCguidelines/approv_wq_guide/approved.html

Ministry of Environment (MOE) (2008) Ambient Aquatic Life Guidelines for Iron. Overview Report
http://www.env.gov.bc.ca/wat/wq/BCguidelines/iron/iron_overview.pdf

Nagpal, N.K., L.W. Pommen and L.G. Swain (2006). A Compendium of Working Water Quality Guidelines for British Columbia Updated August 2006.
http://www.env.gov.bc.ca/wat/wq/BCguidelines/working.html

Applied Polymer Systems, Inc.



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Material Safety Data Sheet

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: APS 712 Silt Stop

Supplied:
Applied Polymer Systems Inc.
Woodstock, GA 30189
Tel. 678-494-5998
Fax. 678-494-5298
www.siltstop.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Identification of the preparation: Anionic water-soluble Co-polymer blend

3. HAZARD IDENTIFICATION

Aqueous solutions or powders that become wet render surfaces extremely slippery.

4. FIRST AID MEASURES

Inhalation: Move to fresh air.

Skin contact: Contact with wet skin could cause severe irritation and / or burning. Wash with water and soap. In case of persistent skin irritation, consult a physician.

Eye contact: Rinse thoroughly with plenty of water, also under the eyelids, seek medical attention in case of persistent irritation.

Ingestion: Consult a physician

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water, water spray, foam, carbon dioxide, dry powder.

Special fire-fighting precautions: Aqueous solutions or powders that become wet render surfaces extremely slippery.
Protective equipment for firefighters: No special equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions required.

Methods for cleaning up: Do Not flush with water. Clean up promptly by sweeping or vacuum. Keep in suitable and closed containers for disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Avoid dust formation. Do not breath dust. Use dust mask during handling. Wash hands after handling.

Storage: Keep in a cool, dry place. (0-30

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Use local exhaust if dusting occurs. Natural ventilation is adequate in absence of dust.

Personal protection equipment

Respiratory Protection: Dust safety masks are recommended where dusting may occur.
Hand protection: Dry cloth, leather or rubber gloves.
Eye Protection: Safety glasses with side shields or face masks. Do not wear contact lenses.
Skin protection: No special protective clothing required.
Hygiene measures: Wash hands before breaks and at end of work day.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	**Granular solid**
Color:	**White / Brown**
Odor:	**None**
pH:	**5-7**
Melting point:	**N/A**
Flash point:	**N/A**
Vapor density:	**N/A**

10. STABILITY AND REACTIVITY

Stability: Product is stable, no hazardous polymerization will occur.

Materials to avoid: Oxidizing agents may cause exothermic reactions.
Hazardous decomposition products: Thermal decomposition may produce nitrogen oxides (NOx), carbon oxides.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral: LD 50 / oral / rat > 5000 mg / kg

Inhalation: The product is not expected to be toxic by inhalation.

Dermal: The results of testing on rabbits showed no toxicity even at high dose levels.

Chronic toxicity: A two year feeding study on rats did not reveal adverse health effects. A one year feeding study on dogs did not reveal adverse health effects.

12. ECOLOGICAL INFORMATION

Water Flea: LC 50 / *Ceriodaphnia dubia* / 48h / 1,617ppm

Flathead Minnow: LC 50 / *Pimephales promelas* / 48 h / >6,720 ppm

Flathead Minnow: LC 50 / *Pimephales promelas* / 96 h / >6,720 ppm

Bioaccumulation: The product is not expected to bioaccumulate.

Persistence / degradability: Not readily biodegradable: (~40% after 28 days).

13. TRANSPORT AND REGULATORY INFORMATION

Not regulated by DOT, **RCRA status-Not a hazardous waste**

NFPA and HMIS ratings:

NFPA	**Health:**	**3**	**Flammability:**	**0**	**Reactivity:**	**1**
HMIS	**Health**	**2**	**Flammability**	**0**	**Reactivity**	**1**

Updated 10/23/06

Applied Polymer Systems, Inc.

Material Safety Data Sheet

1. IDENTIFICATION OF THE PRODUCT AND THE COMPANY

Product Name: APS 703d #3 Floc Log®

Supplied:
Applied Polymer Systems, Inc.
519 Industrial Drive
Woodstock, GA 30189
Tel. 678-494-5998
Fax. 678-494-5298
www.siltstop.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Identification of the preparation: Anionic water-soluble Co-polymer gel

3. HAZARD IDENTIFICATION

Placement of these materials on wet walking surface will create extreme slipping hazard.

4. FIRST AID MEASURES

Inhalation: None

Skin contact: Contact with wet skin could cause dryness and chapping. Wash with water and soap. Use of gloves recommended.

Eye contact: Rinse thoroughly with plenty of water, also under the eyelids, seek medical attention in case of persistent irritation.

Ingestion: Consult a physician

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: Water, water spray, foam, carbon dioxide, dry powder.

Special fire-fighting precautions: Floc Logs that become wet render surfaces extremely slippery.

Protective equipment for firefighters: No special equipment required.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions required.

Methods for cleaning up: Dry wipe as well as possible, Keep in suitable and closed containers for disposal. After cleaning, flush away traces with water.

7. HANDLING AND STORAGE

Handling: Avoid contact with skin and eyes. Wash hands after handling.

Storage: Keep in a cool, dry place.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering controls: Use dry handling areas only.

Personal protection equipment

Respiratory Protection:	None
Hand protection:	Dry cloth, leather or rubber gloves.
Eye Protection:	Safety glasses with side shields. Do not wear contact lenses.
Skin protection:	No special protective clothing required.
Hygiene measures:	Wash hands before breaks and at end of work day.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form:	Granular semi-solid gel
Color:	White to Brown
Odor:	None
pII:	3-10
Melting point:	N/A
Flash point:	N/A
Vapor density:	N/A

10. STABILITY AND REACTIVITY

Stability: Product is stable, no hazardous polymerization will occur.

Materials to avoid: Oxidizing agents may cause exothermic reactions.

Hazardous decomposition products: Thermal decomposition may produce nitrogen oxides (NOx), carbon oxides.

11. TOXICOLOGICAL / ECOLOGICAL INFORMATION

Acute toxicity (EPA-821-R-02-012)

LC 50 (Survival) / *Ceriodaphnia dubia* / 48h / 673 ppm
NOAEC (Survival) / *Ceriodaphnia dubia* / 48h / 420 ppm
LC 50 / *Oncorhynchus mykiss* / 96h / 2928 ppm

Chronic toxicity (EPA-821-R-02-013)

IC 25 (Survival) / *P. promelas* / 7 day / 77.8 ppm
NOEC (Survival) / *P. promelas* / 7 day / 52.5 ppm

IC 25 (Survival) / *C. dubia* / 7 day / 78.7 ppm
NOEC (Survival) / *C. dubia* / 7 day / 52.7 ppm

IC 25 (Growth) / *P. promelas* / 7 day / 50.1 ppm
NOEC (Growth) / *P. promelas* / 7 day / 52.5 ppm

IC 25 (Reproduction) / *C. dubia* / 7 day / 66.8 ppm
NOEC (Reproduction) / *C. dubia* / 7 day / 52.5 ppm

Bioaccumulation: The product is not expected to bioaccumulate.
Persistence / degradability: Not readily biodegradable: (~85% after 180 days).

13. TRANSPORT AND REGULATORY INFORMATION

Not regulated by DOT, RCRA status-Not a hazardous waste

NFPA and HMIS ratings:

NFPA	**Health:**	**3**	**Flammability:**	**0**	**Reactivity:**	**1**
HMIS	**Health**	**2**	**Flammability**	**0**	**Reactivity**	**1**

CERTIFICATE OF ANALYSIS

CLIENT **Levelton Consultants Ltd. - Hazmat Surrey**
#301 - 19292 - 60th Avenue
Surrey, BC
V3S 8E5
TEL 604-533-2992
FAX 604-533-0768

ATTENTION **Jay Rao**

DATE RECEIVED	Jun-18-08	**WORK ORDER #**	R806231
DATE REPORTED	Jun-24-08	**PROJECT FILE**	FV08-0839
COC #(s)	10473	**PROJECT NAME**	Horseshoe Slough-Groundwater Inverstigation

General Comments:

CARO Analytical Services employs methods which are based on those found in "Standard Methods for the Examination of Water and Wastewater", 21st Edition, 2005, published by the American Public Health Association (APHA); US EPA protocols found in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846", 3rd Edition; and protocols published by the British Columbia Ministry of Environment (BCMOE).

Methods not described in these publications are conducted according to procedures accepted by appropriate regulatory agencies, and/or are done in accordance with recognized professional standards using accepted testing methodologies and quality control efforts except where otherwise agreed to by the client.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirity. CARO Analytical Services is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Samples will be disposed of 30 days after the test report has been issued unless otherwise agreed to in writing.

- All solids results are reported on a dry weight basis unless otherwise noted
- Units: mg/kg = milligrams per kilogram, equivalent to parts per million (ppm)
  mg/L = milligrams per Litre, equivalent to parts per million (ppm)
  ug/L = micrograms per Litre, equivalent to parts per billion (ppb)
  ug/g = micrograms per gram, equivalent to parts per million (ppm)
- "RDL" = reported detection limit
- "<" = less than reported detection limit
- "-" = not analyzed

CARO Analytical Services

Final Review Per:

Patrick Novak, B.Sc.
Customer Service Manager

SAMPLE DATA

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

Dissolved Metals by ICPMS

Analyte	Result	RDL	Units	Analyzed	Batch #	Method	Analyst	Notes
08-MW1 (R806231-01) Matrix: Water						Sampled: Jun-18-08		
Aluminum	<50	50	ug/L	Jun-23-08	R801686	EPA 6020A	IND	
Antimony	<3.0	3.0	"	"	"	"	"	
Arsenic	<5.0	5.0	"		"	"	"	
Barium	351	5	"		"	"	"	
Beryllium	<2.0	2.0	"		"	"	"	
Boron	1420	20	"		"	"	"	
Cadmium	<0.10	0.10	"		"	"	"	
Calcium	312000	10000	"	Jun-23-08	"	"	"	
Chromium	5	5	"		"	"	"	
Cobalt	0.9	0.5	"	"	"	"	"	
Copper	52.8	3.0	"		"	"	"	
Iron	14300	200	"		"	"	"	
Lead	<1.0	1.0	"		"	"	"	
Lithium	9.8	2.0	"		"	"	"	
Magnesium	559000	4000	"	Jun-23-08	"	"	"	
Manganese	6300	5.0	"		"	"	"	
Mercury	<0.30	0.30	"	"	"	"	"	
Molybdenum	3.0	1.0	"		"	"	"	
Nickel	9	5	"		"	"	"	
Selenium	15.9	5.0	"		"	"	"	
Silver	<0.40	0.40	"		"	"	"	
Sodium	4690000	4000	"		"	"	"	
Strontium	4210	5	"		"	"	"	
Thallium	<0.5	0.5	"		"	"	"	
Titanium	<100	100	"		"	"	"	
Uranium	<0.5	0.5	"		"	"	"	
Vanadium	<10	10	"		"	"	"	
Zinc	<30	30	"		"	"	"	

SAMPLE DATA

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

Dissolved Metals by ICPMS

Analyte	Result	RDL	Units	Analyzed	Batch #	Method	Analyst	Notes
08-SLOUGH (R806231-02) Matrix: Water							Sampled: Jun-18-08	
Aluminum	<50	50	ug/L	Jun-23-08	R801686	EPA 6020A	IND	
Antimony	<3.0	3.0	"	"	"	"	"	
Arsenic	<5.0	5.0	"		"	"	"	
Barium	99	5	"		"	"	"	
Beryllium	<2.0	2.0	"		"	"	"	
Boron	186	20	"		"	"	"	
Cadmium	<0.10	0.10	"		"	"	"	
Calcium	62100	500	"		"	"	"	
Chromium	<5	5	"		"	"	"	
Cobalt	0.6	0.5	"		"	"	"	
Copper	3.1	3.0	"		"	"	"	
Iron	9800	200	"		"	"	"	
Lead	<1.0	1.0	"		"	"	"	
Lithium	5.3	2.0	"		"	"	"	
Magnesium	66100	200	"		"	"	"	
Manganese	1590	5.0	"		"	"	"	
Mercury	<0.30	0.30	"		"	"	"	
Molybdenum	1.1	1.0	"		"	"	"	
Nickel	<5	5	"		"	"	"	
Selenium	<5.0	5.0	"		"	"	"	
Silver	<0.40	0.40	"		"	"	"	
Sodium	405000	4000	"	Jun-23-08	"	"	"	
Strontium	540	5	"		"	"	"	
Thallium	<0.5	0.5	"	"	"	"	"	
Titanium	<100	100	"		"	"	"	
Uranium	<0.5	0.5	"		"	"	"	
Vanadium	<10	10	"		"	"	"	
Zinc	<30	30	"		"	"	"	

SAMPLE DATA

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

Dissolved Metals by ICPMS

Analyte	Result	RDL	Units	Analyzed	Batch #	Method	Analyst	Notes
08-DUP #1 (R806231-03) Matrix: Water							Sampled: Jun-18-08	
Aluminum	<50	50	ug/L	Jun-23-08	R801686	EPA 6020A	IND	
Antimony	<3.0	3.0	"	"	"	"	"	
Arsenic	<5.0	5.0	"		"	"	"	
Barium	345	5	"		"	"	"	
Beryllium	<2.0	2.0	"		"	"	"	
Boron	1430	20	"		"	"	"	
Cadmium	<0.10	0.10	"		"	"	"	
Calcium	312000	10000	"	Jun-23-08	"	"	"	
Chromium	5	5	"		"	"	"	
Cobalt	1.0	0.5	"	"	"	"	"	
Copper	50.1	3.0	"		"	"	"	
Iron	13700	200	"		"	"	"	
Lead	<1.0	1.0	"		"	"	"	
Lithium	10.0	2.0	"		"	"	"	
Magnesium	569000	4000	"	Jun-23-08	"	"	"	
Manganese	6180	5.0	"		"	"	"	
Mercury	<0.30	0.30	"	"	"	"	"	
Molybdenum	3.2	1.0	"		"	"	"	
Nickel	10	5	"		"	"	"	
Selenium	9.0	5.0	"		"	"	"	
Silver	<0.40	0.40	"		"	"	"	
Sodium	4720000	4000	"	Jun-23-08	"	"	"	
Strontium	4180	5	"		"	"	"	
Thallium	<0.5	0.5	"	"	"	"	"	
Titanium	<100	100	"		"	"	"	
Uranium	<0.5	0.5	"		"	"	"	
Vanadium	<10	10	"		"	"	"	
Zinc	<30	30	"		"	"	"	

SAMPLE DATA

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

General Parameters

Analyte	Result	RDL	Units	Analyzed	Batch #	Method	Analyst	Notes
08-MW1 (R806231-01) Matrix: Water							Sampled: Jun-18-08	
Hardness, Total (Total as CaCO3)	3560	20.7	mg/L	Jun-23-08	[CALC]	APHA 2340 B	IND	
Hardness, Total (Dissolved as CaCO3)	3080	41	"		"	"	"	
08-SLOUGH (R806231-02) Matrix: Water							Sampled: Jun-18-08	
Hardness, Total (Total as CaCO3)	413	20.7	mg/L	Jun-23-08	[CALC]	APHA 2340 B	IND	
Hardness, Total (Dissolved as CaCO3)	427	2	"		"	"	"	
08-DUP #1 (R806231-03) Matrix: Water							Sampled: Jun-18-08	
Hardness, Total (Dissolved as CaCO3)	3120	41	mg/L	Jun-23-08	[CALC]	APHA 2340 B	IND	

SAMPLE DATA

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

Polycyclic Aromatic Hydrocarbons

Analyte	Result	RDL	Units	Analyzed	Batch #	Method	Analyst	Notes
08-MW1 (R806231-01) Matrix: Water						Sampled: Jun-18-08		
Acenaphthene	<0.05	0.05	ug/L	Jun-19-08	R801692	EPA 3510C/8270B	ING	
Acenaphthylene	<0.05	0.05	"	"	"	"	"	
Acridine	<0.10	0.10	"		"	"	"	
Anthracene	<0.05	0.05	"		"	"	"	
Benzo (a) anthracene	<0.05	0.05	"		"	"	"	
Benzo (a) pyrene	<0.05	0.05	"		"	"	"	
Benzo (b) fluoranthene	<0.05	0.05	"		"	"	"	
Benzo (g,h,i) perylene	<0.05	0.05	"		"	"	"	
Benzo (k) fluoranthene	<0.05	0.05	"		"	"	"	
Chrysene	<0.05	0.05	"		"	"	"	
Dibenz (a,h) anthracene	<0.05	0.05	"		"	"	"	
Fluoranthene	<0.05	0.05	"		"	"	"	
Fluorene	<0.05	0.05	"		"	"	"	
Indeno (1,2,3-cd) pyrene	<0.05	0.05	"		"	"	"	
Naphthalene	<0.10	0.10	"		"	"	"	
Phenanthrene	<0.10	0.10	"		"	"	"	
Pyrene	<0.10	0.10	"		"	"	"	
Quinoline	<0.10	0.10	"		"	"	"	
Surrogate: Naphthalene-d8	*64 %*	*50-130*		"		"	"	
Surrogate: Acenaphthene-d10	*72 %*	*50-130*		"		"	"	
Surrogate: Phenanthrene-d10	*82 %*	*60-130*		"		"	"	
Surrogate: Chrysene-d12	*77 %*	*60-130*		"		"	"	
Surrogate: Perylene-d12	*84 %*	*60-130*		"		"	"	

SAMPLE DATA

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

Total Recoverable Metals by ICPMS

Analyte	Result	RDL	Units	Analyzed	Batch #	Method	Analyst	Notes
08-MW1 (R806231-01) Matrix: Water						Sampled: Jun-18-08		
Aluminum	9.10	0.500	mg/L	Jun-23-08	R801716	EPA 6020A	IND	
Antimony	<0.0300	0.0300	"	"	"	"	"	
Arsenic	<0.0500	0.0500	"		"	"	"	
Barium	0.475	0.050	"		"	"	"	
Beryllium	<0.0200	0.0200	"		"	"	"	
Boron	1.60	0.200	"		"	"	"	
Cadmium	<0.00100	0.00100	"		"	"	"	
Calcium	358	5.0	"		"	"	"	
Chromium	<0.050	0.050	"		"	"	"	
Cobalt	0.0059	0.0050	"		"	"	"	
Copper	0.0563	0.0300	"		"	"	"	
Iron	26.3	2.00	"		"	"	"	
Lead	<0.0100	0.0100	"		"	"	"	
Lithium	<0.0200	0.0200	"		"	"	"	
Magnesium	649	2.00	"		"	"	"	
Manganese	7.33	0.0500	"		"	"	"	
Mercury	<0.00300	0.00300	"		"	"	"	
Molybdenum	<0.0100	0.0100	"		"	"	"	
Nickel	<0.050	0.050	"		"	"	"	
Selenium	<0.0500	0.0500	"		"	"	"	
Silver	<0.00400	0.00400	"		"	"	"	
Sodium	4710	2.00	"		"	"	"	
Thallium	<0.0050	0.0050	"		"	"	"	
Titanium	<1.00	1.00	"		"	"	"	
Uranium	<0.0050	0.0050	"		"	"	"	
Vanadium	<0.100	0.100	"		"	"	"	
Zinc	<0.300	0.300	"		"	"	"	

SAMPLE DATA

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

Total Recoverable Metals by ICPMS

Analyte	Result	RDL	Units	Analyzed	Batch #	Method	Analyst	Notes
08-SLOUGH (R806231-02) Matrix: Water							Sampled: Jun-18-08	
Aluminum	0.873	0.500	mg/L	Jun-23-08	R801716	EPA 6020A	IND	
Antimony	<0.0300	0.0300	"	"	"	"	"	
Arsenic	<0.0500	0.0500	"		"	"	"	
Barium	0.097	0.050	"		"	"	"	
Beryllium	<0.0200	0.0200	"		"	"	"	
Boron	<0.200	0.200	"		"	"	"	
Cadmium	<0.00100	0.00100	"		"	"	"	
Calcium	72.3	5.0	"		"	"	"	
Chromium	<0.050	0.050	"		"	"	"	
Cobalt	<0.0050	0.0050	"		"	"	"	
Copper	<0.0300	0.0300	"		"	"	"	
Iron	16.9	2.00	"		"	"	"	
Lead	<0.0100	0.0100	"		"	"	"	
Lithium	<0.0200	0.0200	"		"	"	"	
Magnesium	56.6	2.00	"		"	"	"	
Manganese	1.35	0.0500	"		"	"	"	
Mercury	<0.00300	0.00300	"		"	"	"	
Molybdenum	<0.0100	0.0100	"		"	"	"	
Nickel	<0.050	0.050	"		"	"	"	
Selenium	<0.0500	0.0500	"		"	"	"	
Silver	<0.00400	0.00400	"		"	"	"	
Sodium	278	2.00	"		"	"	"	
Thallium	<0.0050	0.0050	"		"	"	"	
Titanium	<1.00	1.00	"		"	"	"	
Uranium	<0.0050	0.0050	"		"	"	"	
Vanadium	<0.100	0.100	"		"	"	"	
Zinc	<0.300	0.300	"		"	"	"	
08-DUP #2 (R806231-04) Matrix: Water							Sampled: Jun-18-08	
Iron	18.4	2.00	mg/L	Jun-23-08	R801716	EPA 6020A	IND	

QUALITY CONTROL DATA

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	Rel % Diff(RPD)	RPD Limit	Notes
Polycyclic Aromatic Hydrocarbons , Batch R801692										
Method Blank (R801692-BLK1)				Prepared & Analyzed: Jun-19-08						
Acenaphthene	<	0.05	ug/L							
Acenaphthylene	<	0.05	"							
Acridine	<	0.10	"							
Anthracene	<	0.05	"							
Benzo (a) anthracene	<	0.05	"							
Benzo (a) pyrene	<	0.05	"							
Benzo (b) fluoranthene	<	0.05	"							
Benzo (g,h,i) perylene	<	0.05	"							
Benzo (k) fluoranthene	<	0.05	"							
Chrysene	<	0.05	"							
Dibenz (a,h) anthracene	<	0.05	"							
Fluoranthene	<	0.05	"							
Fluorene	<	0.05	"							
Indeno (1,2,3-cd) pyrene	<	0.05	"							
Naphthalene	<	0.10	"							
Phenanthrene	<	0.10	"							
Pyrene	<	0.10	"							
Quinoline	<	0.10	"							
Surrogate: Naphthalene-d8	*0.714*		*"*	*1.00*		*71*	*50-130*			
Surrogate: Acenaphthene-d10	*0.813*		*"*	*1.00*		*81*	*50-130*			
Surrogate: Phenanthrene-d10	*0.944*		*"*	*1.00*		*94*	*60-130*			
Surrogate: Chrysene-d12	*1.05*		*"*	*1.00*		*105*	*60-130*			
Surrogate: Perylene-d12	*1.03*		*"*	*1.00*		*103*	*60-130*			
Blank Spike (R801692-BS1)				Prepared & Analyzed: Jun-19-08						
Acenaphthene	0.69	0.05	ug/L	1.00		69	50-130			
Acenaphthylene	0.73	0.05	"	1.00		73	50-130			
Acridine	0.84	0.10	"	1.00		84	50-130			
Anthracene	0.70	0.05	"	1.00		70	60-130			
Benzo (a) anthracene	0.70	0.05	"	1.00		70	60-130			
Benzo (a) pyrene	0.64	0.05	"	1.00		64	60-130			
Benzo (b) fluoranthene	0.70	0.05	"	1.00		70	60-130			
Benzo (g,h,i) perylene	0.66	0.05	"	1.00		66	60-130			
Benzo (k) fluoranthene	0.73	0.05	"	1.00		73	60-130			
Chrysene	0.77	0.05	"	1.00		77	60-130			
Dibenz (a,h) anthracene	0.62	0.05	"	1.00		62	60-130			
Fluoranthene	0.78	0.05	"	1.00		78	60-130			
Fluorene	0.72	0.05	"	1.00		72	50-130			
Indeno (1,2,3-cd) pyrene	0.76	0.05	"	1.00		76	60-130			
Naphthalene	0.70	0.10	"	1.00		70	50-130			
Phenanthrene	0.79	0.10	"	1.00		79	60-130			
Pyrene	0.80	0.10	"	1.00		80	60-130			
Quinoline	0.83	0.10	"	1.00		83	50-130			
Surrogate: Naphthalene-d8	*0.790*		*"*	*1.00*		*79*	*50-130*			
Surrogate: Acenaphthene-d10	*0.786*		*"*	*1.00*		*79*	*50-130*			
Surrogate: Phenanthrene-d10	*0.915*		*"*	*1.00*		*92*	*60-130*			
Surrogate: Chrysene-d12	*0.932*		*"*	*1.00*		*93*	*60-130*			
Surrogate: Perylene-d12	*0.917*		*"*	*1.00*		*92*	*60-130*			
Calibration Check (R801692-CCV1)				Prepared & Analyzed: Jun-19-08						
Acenaphthene	961		ug/L	1000		96	80-120			
Acenaphthylene	995		"	1000		100	80-120			
Acridine	1120		"	1000		112	80-120			
Anthracene	949		"	1000		95	80-120			
Benzo (a) anthracene	978		"	1000		98	80-120			
Benzo (a) pyrene	937		"	1000		94	80-120			
Benzo (b) fluoranthene	934		"	1000		93	80-120			
Benzo (g,h,i) perylene	882		"	1000		88	80-120			

WORK ORDER # R806231 **DATE REPORTED** Jun-24-08

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	Rel % Diff(RPD)	RPD Limit	Notes
Polycyclic Aromatic Hydrocarbons , Batch R801692 (Continued)										
Calibration Check (R801692-CCV1)				Prepared & Analyzed: Jun-19-08						
Benzo (k) fluoranthene	983		ug/L	1000		98	80-120			
Chrysene	1030		"	1000		103	80-120			
Dibenz (a,h) anthracene	851		"	1000		85	80-120			
Fluoranthene	951		"	1000		95	80-120			
Fluorene	959		"	1000		96	80-120			
Indeno (1,2,3-cd) pyrene	893		"	1000		89	80-120			
Naphthalene	1030		"	1000		103	80-120			
Phenanthrene	980		"	1000		98	80-120			
Pyrene	952		"	1000		95	80-120			
Quinoline	1130		"	995		113	80-120			
Surrogate: Naphthalene-d8	*1090*		*"*	*1000*		*109*	*80-120*			
Surrogate: Acenaphthene-d10	*991*		*"*	*1000*		*99*	*80-120*			
Surrogate: Phenanthrene-d10	*1020*		*"*	*1000*		*102*	*80-120*			
Surrogate: Chrysene-d12	*1070*		*"*	*1000*		*107*	*80-120*			
Surrogate: Perylene-d12	*930*		*"*	*1000*		*93*	*80-120*			
Dissolved Metals by ICPMS , Batch R801686										
Method Blank (R801686-BLK1)				Prepared & Analyzed: Jun-19-08						
Aluminum	<	50	ug/L							
Antimony	<	3.0	"							
Arsenic	<	5.0	"							
Barium	<	5	"							
Beryllium	<	2.0	"							
Boron	<	20	"							
Cadmium	<	0.10	"							
Calcium	<	500	"							
Chromium	<	5	"							
Cobalt	<	0.5	"							
Copper	<	3.0	"							
Iron	<	200	"							
Lead	<	1.0	"							
Lithium	<	2.0	"							
Magnesium	<	200	"							
Manganese	<	5.0	"							
Mercury	<	0.30	"							
Molybdenum	<	1.0	"							
Nickel	<	5	"							
Selenium	<	5.0	"							
Silver	<	0.40	"							
Sodium	<	200	"							
Strontium	<	5	"							
Thallium	<	0.5	"							
Titanium	<	100	"							
Uranium	<	0.5	"							
Vanadium	<	10	"							
Zinc	<	30	"							
Method Blank (R801686-BLK2)				Prepared: Jun-19-08 Analyzed: Jun-20-08						
Aluminum	<	50	ug/L							
Antimony	<	3.0	"							
Arsenic	<	5.0	"							
Barium	<	5	"							
Beryllium	<	2.0	"							
Boron	<	20	"							
Cadmium	<	0.10	"							
Calcium	<	500	"							

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	Rel % Diff(RPD)	RPD Limit	Notes
Dissolved Metals by ICPMS , Batch R801686 (Continued)										
Method Blank (R801686-BLK2)				Prepared: Jun-19-08 Analyzed: Jun-20-08						
Chromium	<	5	ug/L							
Cobalt	<	0.5	"							
Copper	<	3.0	"							
Iron	<	200	"							
Lead	<	1.0	"							
Lithium	<	2.0	"							
Magnesium	<	200	"							
Manganese	<	5.0	"							
Mercury	<	0.30	"							
Molybdenum	<	1.0	"							
Nickel	<	5	"							
Selenium	<	5.0	"							
Silver	<	0.40	"							
Sodium	<	200	"							
Strontium	<	5	"							
Thallium	<	0.5	"							
Titanium	<	100	"							
Uranium	<	0.5	"							
Vanadium	<	10	"							
Zinc	<	30	"							
Duplicate (R801686-DUP2)		**Source: R806231-02**		Prepared: Jun-19-08 Analyzed: Jun-23-08						
Aluminum	<	50	ug/L		<				20	
Antimony	<	3.0	"		<				20	
Arsenic	<	5.0	"		<				20	
Barium	99	5	"		99			0.3	20	
Beryllium	<	2.0	"		<				20	
Boron	186	20	"		186			0.3	20	
Cadmium	<	0.10	"		<				20	
Calcium	62300	500	"		62100			0.3	20	
Chromium	<	5	"		<				20	
Cobalt	0.6	0.5	"		0.6				20	
Copper	3.1	3.0	"		3.1				20	
Iron	9830	200	"		9800			0.3	20	
Lead	<	1.0	"		<				20	
Lithium	5.5	2.0	"		5.3				20	
Magnesium	64400	200	"		66100			3	20	
Manganese	1580	5.0	"		1590			0.7	20	
Mercury	<	0.30	"		<				20	
Molybdenum	1.1	1.0	"		1.1				20	
Nickel	<	5	"		<				20	
Selenium	5.1	5.0	"		<				20	
Silver	<	0.40	"		<				20	
Sodium	391000	200	"		405000			4	20	
Strontium	553	5	"		540			2	20	
Thallium	<	0.5	"		<				20	
Titanium	<	100	"		<				20	
Uranium	<	0.5	"		<				20	
Vanadium	<	10	"		<				20	
Zinc	<	30	"		<				20	
Matrix Spike (R801686-MS2)		**Source: R806231-03**		Prepared: Jun-19-08 Analyzed: Jun-20-08						
Antimony	1070	3.0	ug/L	1000	<	107	80-120			
Arsenic	450	5.0	"	500	<	90	80-120			
Barium	3190	5	"	2500	345	114	70-130			
Beryllium	585	2.0	"	1000	<	58	70-130			MS1
Cadmium	262	0.10	"	250	<	105	70-130			
Chromium	844	5	"	1000	5	84	70-130			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	Rel % Diff(RPD)	RPD Limit	Notes
Dissolved Metals by ICPMS , Batch R801686 (Continued)										
Matrix Spike (R801686-MS2)	**Source: R806231-03**			Prepared: Jun-19-08 Analyzed: Jun-20-08						
Cobalt	848	0.5	ug/L	1000	1.0	85	70-130			
Copper	759	3.0	"	1000	50.1	71	70-130			
Iron	15400	200	"	5000	13700	36	70-130			MS1
Lead	473	1.0	"	500	<	95	70-130			
Manganese	5670	5.0	"	1000	6180	NR	70-130			MS1
Nickel	815	5	"	1000	10	81	70-130			
Selenium	260	5.0	"	250	9.0	101	80-120			
Silver	190	0.40	"	250	<	76	60-140			
Thallium	241	0.5	"	250	<	96	80-120			
Vanadium	415	10	"	500	<	83	80-120			
Zinc	1810	30	"	2500	<	72	70-130			
Reference (R801686-SRM1)				Prepared & Analyzed: Jun-19-08						
Aluminum	174	50	ug/L	209		83	80-120			
Antimony	43.9	3.0	"	40.0		110	80-120			
Arsenic	362	5.0	"	400		90	80-120			
Barium	3220	5	"	3120		103	80-120			
Beryllium	180	2.0	"	197		91	80-120			
Boron	1450	20	"	1610		90	80-120			
Cadmium	196	0.10	"	200		98	80-120			
Calcium	5990	500	"	6500		92	80-120			
Chromium	355	5	"	401		88	80-120			
Cobalt	105	0.5	"	119		88	80-120			
Copper	695	3.0	"	781		89	80-120			
Iron	1060	200	"	1170		90	80-120			
Lead	98.8	1.0	"	102		97	80-120			
Lithium	82.0	2.0	"	96.0		85	80-120			
Magnesium	5100	200	"	6110		84	80-120			
Manganese	272	5.0	"	318		86	80-120			
Molybdenum	397	1.0	"	387		103	80-120			
Nickel	717	5	"	789		91	80-120			
Selenium	25.5	5.0	"	30.0		85	80-120			
Sodium	14200	200	"	17400		82	80-120			
Strontium	929	5	"	979		95	80-120			
Thallium	39.1	0.5	"	35.0		112	80-120			
Uranium	215	0.5	"	244		88	80-120			
Vanadium	704	10	"	798		88	80-120			
Zinc	694	30	"	800		87	80-120			
Reference (R801686-SRM2)				Prepared: Jun-19-08 Analyzed: Jun-24-08						
Aluminum	183	50	ug/L	209		87	80-120			
Antimony	38.8	3.0	"	40.0		97	80-120			
Arsenic	365	5.0	"	400		91	80-120			
Barium	2990	5	"	3120		96	80-120			
Beryllium	192	2.0	"	197		97	80-120			
Boron	1450	20	"	1610		90	80-120			
Cadmium	186	0.10	"	200		93	80-120			
Calcium	5800	500	"	6500		89	80-120			
Chromium	379	5	"	401		95	80-120			
Cobalt	108	0.5	"	119		91	80-120			
Copper	761	3.0	"	781		97	80-120			
Iron	1040	200	"	1170		89	80-120			
Lead	99.2	1.0	"	102		97	80-120			
Lithium	98.6	2.0	"	96.0		103	80-120			
Magnesium	5530	200	"	6110		90	80-120			
Manganese	293	5.0	"	318		92	80-120			
Molybdenum	396	1.0	"	387		102	80-120			
Nickel	752	5	"	789		95	80-120			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	Rel % Diff(RPD)	RPD Limit	Notes
Dissolved Metals by ICPMS , Batch R801686 (Continued)										
Reference (R801686-SRM2)				Prepared: Jun-19-08 Analyzed: Jun-24-08						
Selenium	25.2	5.0	ug/L	30.0		84	80-120			
Sodium	15700	200	"	17400		90	80-120			
Strontium	976	5	"	979		100	80-120			
Thallium	38.2	0.5	"	35.0		109	80-120			
Uranium	184	0.5	"	244		76	80-120			SRM
Vanadium	715	10	"	798		90	80-120			
Zinc	758	30	"	800		95	80-120			
Total Recoverable Metals by ICPMS , Batch R801716										
Method Blank (R801716-BLK1)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Aluminum	<	0.050	mg/L							
Antimony	<	0.0030	"							
Arsenic	<	0.0050	"							
Barium	<	0.005	"							
Beryllium	<	0.0020	"							
Boron	<	0.020	"							
Cadmium	<	0.00010	"							
Calcium	<	0.5	"							
Chromium	<	0.015	"							
Cobalt	<	0.0005	"							
Copper	<	0.0030	"							
Iron	<	0.10	"							
Lead	<	0.0010	"							
Lithium	<	0.0020	"							
Magnesium	<	0.20	"							
Manganese	<	0.0050	"							
Mercury	<	0.00030	"							
Molybdenum	0.0011	0.0010	"							BLK
Nickel	<	0.005	"							
Selenium	<	0.0050	"							
Silver	<	0.00040	"							
Sodium	<	0.20	"							
Thallium	<	0.0005	"							
Titanium	<	0.10	"							
Uranium	<	0.0005	"							
Vanadium	<	0.010	"							
Zinc	<	0.030	"							
Method Blank (R801716-BLK2)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Aluminum	<	0.050	mg/L							
Antimony	<	0.0030	"							
Arsenic	<	0.0050	"							
Barium	<	0.005	"							
Beryllium	<	0.0020	"							
Boron	<	0.020	"							
Cadmium	<	0.00010	"							
Calcium	<	0.5	"							
Chromium	<	0.015	"							
Cobalt	<	0.0005	"							
Copper	<	0.0030	"							
Iron	<	0.10	"							
Lead	<	0.0010	"							
Lithium	<	0.0020	"							
Magnesium	<	0.20	"							
Manganese	<	0.0050	"							
Mercury	<	0.00030	"							

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	Rel % Diff(RPD)	RPD Limit	Notes
Total Recoverable Metals by ICPMS , Batch R801716 (Continued)										
Method Blank (R801716-BLK2)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Molybdenum	<	0.0010	mg/L							
Nickel	<	0.005	"							
Selenium	<	0.0050	"							
Silver	<	0.00040	"							
Sodium	<	0.20	"							
Thallium	<	0.0005	"							
Titanium	<	0.10	"							
Uranium	<	0.0005	"							
Vanadium	<	0.010	"							
Zinc	<	0.030	"							
Method Blank (R801716-BLK3)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Aluminum	<	0.050	mg/L							
Antimony	<	0.0030	"							
Arsenic	<	0.0050	"							
Barium	<	0.005	"							
Beryllium	<	0.0020	"							
Boron	<	0.020	"							
Cadmium	<	0.00010	"							
Calcium	<	0.5	"							
Chromium	<	0.015	"							
Cobalt	<	0.0005	"							
Copper	<	0.0030	"							
Iron	<	0.10	"							
Lead	<	0.0010	"							
Lithium	<	0.0020	"							
Magnesium	<	0.20	"							
Manganese	<	0.0050	"							
Mercury	<	0.00030	"							
Molybdenum	<	0.0010	"							
Nickel	<	0.005	"							
Selenium	<	0.0050	"							
Silver	<	0.00040	"							
Sodium	<	0.20	"							
Thallium	<	0.0005	"							
Titanium	<	0.10	"							
Uranium	<	0.0005	"							
Vanadium	<	0.010	"							
Zinc	<	0.030	"							
Method Blank (R801716-BLK4)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Aluminum	<	0.050	mg/L							
Antimony	<	0.0030	"							
Arsenic	<	0.0050	"							
Barium	<	0.005	"							
Beryllium	<	0.0020	"							
Boron	<	0.020	"							
Cadmium	<	0.00010	"							
Calcium	<	0.5	"							
Chromium	<	0.015	"							
Cobalt	<	0.0005	"							
Copper	<	0.0030	"							
Iron	<	0.10	"							
Lead	<	0.0010	"							
Lithium	<	0.0020	"							
Magnesium	<	0.20	"							
Manganese	<	0.0050	"							
Mercury	<	0.00030	"							

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	Rel % Diff(RPD)	RPD Limit	Notes
Total Recoverable Metals by ICPMS , Batch R801716 (Continued)										
Method Blank (R801716-BLK4)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Molybdenum	<	0.0010	mg/L							
Nickel	<	0.005	"							
Selenium	<	0.0050	"							
Silver	<	0.00040	"							
Sodium	<	0.20	"							
Thallium	<	0.0005	"							
Titanium	<	0.10	"							
Uranium	<	0.0005	"							
Vanadium	<	0.010	"							
Zinc	<	0.030	"							
Reference (R801716-SRM1)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Aluminum	0.341	0.050	mg/L	0.330		103	80-120			
Antimony	0.0830	0.0030	"	0.0790		105	80-120			
Arsenic	0.171	0.0050	"	0.159		108	80-120			
Barium	0.630	0.005	"	0.650		97	80-120			
Beryllium	0.0644	0.0020	"	0.0600		107	80-120			
Boron	4.22	0.020	"	3.97		106	80-120			
Cadmium	0.0828	0.00010	"	0.0790		105	80-120			
Calcium	10.6	0.5	"	10.3		103	80-120			
Chromium	0.294	0.015	"	0.274		107	80-120			
Cobalt	0.0413	0.0005	"	0.0390		106	80-120			
Copper	0.223	0.0030	"	0.200		112	80-120			
Iron	0.65	0.10	"	0.590		111	80-120			
Lead	0.284	0.0010	"	0.260		109	80-120			
Manganese	0.138	0.0050	"	0.138		100	80-120			
Molybdenum	0.219	0.0010	"	0.200		110	80-120			
Nickel	0.368	0.005	"	0.340		108	80-120			
Selenium	0.122	0.0050	"	0.120		102	80-120			
Sodium	8.48	0.20	"	8.32		102	80-120			
Thallium	0.106	0.0005	"	0.0970		110	80-120			
Vanadium	0.398	0.010	"	0.390		102	80-120			
Zinc	2.15	0.030	"	2.02		106	80-120			
Reference (R801716-SRM2)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Aluminum	0.335	0.050	mg/L	0.330		102	80-120			
Antimony	0.0804	0.0030	"	0.0790		102	80-120			
Arsenic	0.170	0.0050	"	0.159		107	80-120			
Barium	0.613	0.005	"	0.650		94	80-120			
Beryllium	0.0611	0.0020	"	0.0600		102	80-120			
Boron	4.09	0.020	"	3.97		103	80-120			
Cadmium	0.0822	0.00010	"	0.0790		104	80-120			
Calcium	10.5	0.5	"	10.3		101	80-120			
Chromium	0.296	0.015	"	0.274		108	80-120			
Cobalt	0.0414	0.0005	"	0.0390		106	80-120			
Copper	0.216	0.0030	"	0.200		108	80-120			
Iron	0.62	0.10	"	0.590		105	80-120			
Lead	0.275	0.0010	"	0.260		106	80-120			
Manganese	0.141	0.0050	"	0.138		102	80-120			
Molybdenum	0.216	0.0010	"	0.200		108	80-120			
Nickel	0.367	0.005	"	0.340		108	80-120			
Selenium	0.127	0.0050	"	0.120		106	80-120			
Sodium	8.31	0.20	"	8.32		100	80-120			
Thallium	0.102	0.0005	"	0.0970		105	80-120			
Vanadium	0.397	0.010	"	0.390		102	80-120			
Zinc	2.11	0.030	"	2.02		104	80-120			
Reference (R801716-SRM3)				Prepared: Jun-20-08 Analyzed: Jun-23-08						

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	Rel % Diff(RPD)	RPD Limit	Notes
Total Recoverable Metals by ICPMS , Batch R801716 (Continued)										
Reference (R801716-SRM3)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Aluminum	0.330	0.050	mg/L	0.330		100	80-120			
Antimony	0.0782	0.0030	"	0.0790		99	80-120			
Arsenic	0.163	0.0050	"	0.159		103	80-120			
Barium	0.589	0.005	"	0.650		91	80-120			
Beryllium	0.0572	0.0020	"	0.0600		95	80-120			
Boron	4.01	0.020	"	3.97		101	80-120			
Cadmium	0.0796	0.00010	"	0.0790		101	80-120			
Calcium	10.2	0.5	"	10.3		99	80-120			
Chromium	0.287	0.015	"	0.274		105	80-120			
Cobalt	0.0400	0.0005	"	0.0390		103	80-120			
Copper	0.208	0.0030	"	0.200		104	80-120			
Iron	0.60	0.10	"	0.590		102	80-120			
Lead	0.273	0.0010	"	0.260		105	80-120			
Manganese	0.139	0.0050	"	0.138		100	80-120			
Molybdenum	0.211	0.0010	"	0.200		105	80-120			
Nickel	0.353	0.005	"	0.340		104	80-120			
Selenium	0.119	0.0050	"	0.120		99	80-120			
Sodium	8.38	0.20	"	8.32		101	80-120			
Thallium	0.100	0.0005	"	0.0970		104	80-120			
Vanadium	0.384	0.010	"	0.390		99	80-120			
Zinc	2.04	0.030	"	2.02		101	80-120			
Reference (R801716-SRM4)				Prepared: Jun-20-08 Analyzed: Jun-23-08						
Aluminum	0.326	0.050	mg/L	0.330		99	80-120			
Antimony	0.0773	0.0030	"	0.0790		98	80-120			
Arsenic	0.161	0.0050	"	0.159		101	80-120			
Barium	0.590	0.005	"	0.650		91	80-120			
Beryllium	0.0558	0.0020	"	0.0600		93	80-120			
Boron	3.90	0.020	"	3.97		98	80-120			
Cadmium	0.0783	0.00010	"	0.0790		99	80-120			
Calcium	10.1	0.5	"	10.3		98	80-120			
Chromium	0.279	0.015	"	0.274		102	80-120			
Cobalt	0.0393	0.0005	"	0.0390		101	80-120			
Copper	0.205	0.0030	"	0.200		102	80-120			
Iron	0.58	0.10	"	0.590		99	80-120			
Lead	0.265	0.0010	"	0.260		102	80-120			
Manganese	0.136	0.0050	"	0.138		98	80-120			
Molybdenum	0.211	0.0010	"	0.200		105	80-120			
Nickel	0.347	0.005	"	0.340		102	80-120			
Selenium	0.121	0.0050	"	0.120		101	80-120			
Sodium	8.25	0.20	"	8.32		99	80-120			
Thallium	0.0997	0.0005	"	0.0970		103	80-120			
Vanadium	0.375	0.010	"	0.390		96	80-120			
Zinc	2.02	0.030	"	2.02		100	80-120			

Qualifiers:

BLK	Analyte concentration in method blank is above the reporting limit. Data accepted based on acceptable performance of other batch QC.
MS1	The recovery was outside of QC acceptance limits for the Matrix Spike. Data accepted based on acceptable performance of other batch QC.
SRM	Recovery of one or more analytes on Standard Reference Material (SRM) analysis are outside of control limits. Data accepted based on acceptable performance of other batch QC.

City of Richmond
6911 No. 3 Road, Richmond, BC V6Y 2C1
Telephone 604-276-4000
www.richmond.ca

July 11, 2008
File: T.3289

Business & Financial Services Department
Finance Division
Telephone: 604-276-4218
Fax: 604-276-4162

Dear: Sir/Madam

Attention: TO THOSE THAT HAVE RECEIVED COPIES OF T.3289

Re: Contract T.3289
Addendum No. 2
Horseshoe Slough Pump Station Inlet Upgrade

This addendum forms part of the Contract Documents and shall be read, interpreted and coordinated with all other parts. The costs of all work contained herein shall be included in the Contract Price. The following revisions supersede the information contained in the original Contract Document to the extent referenced and shall become part thereof.

Tenderers shall acknowledge receipt of this addendum by inserting its number and date where provided for on the Form of Tender.

In SECTION A - INSTRUCTIONS TO TENDERERS - PART 1, include the following:

No Claim for Compensation	4.15	Except as expressly and specifically permitted in these instructions to Tenderers, no Tenderer shall have any claim for any compensation of any kind whatsoever, as a result of participating in the tender and by submitting a bid each tenderer shall be deemed to have agreed that it has no claim.

Yours truly,

Kerry Lynne Gillis FOR:
Sumita Dosanjh,
Buyer II - Contracting Specialist

pc: Anthony Fu, EIT, Project Manager

RICHMOND
Island City, by Nature

2477816

Item 2

In **Section D – Documents Specific to this Contract,** page D-15 to D-16, delete item **SSP 8 Dewatering and Drainage** and substitute therefore the following new item **SSP 8 Dewatering and Drainage:**

The *Contractor* shall bear all costs in connection with the effective dewatering of excavations, treatment of dewatering discharge, and all other pumping and drainage necessary for the proper construction of the *Work,* including keeping the subgrade, pipes, structures and trenches free of undesirable accumulations of seepage, subsoil water, surface water or rainwater, with the exception as described herein.

No groundwater shall be permitted to discharge into the drainage system unless they meet Federal and Provincial requirements. Discharge of groundwater into sanitary system requires testing and approval from Greater Vancouver Storm and Sanitary District. All such coordination, if necessary, shall be made by the *Contractor*.

Please refer to *Section H – Ground Water Test Results and Analyses* (Addendum No.1) for information on the ground water properties and discharge treatment options.

The *Contractor* shall provide an environmentally compliant dewatering and discharge strategy that is reflective of the information provided in *Section H - Ground Water Test Results and Analyses,* prior to start of construction. Specifically one strategy based on well-pointing and one strategy based on not well-pointing.

The *Contractor* shall not include well-pointing as part of their bid. However, during construction, if well-pointing is required as determined by the City, then the *Contractor* and the City shall work together to determine the most appropriate and cost effective solution. Any additional costs will be negotiated through a Contemplated Change Order, subject to the City's budget limitations. The *Contractor* shall have no delay related claims in this regard.

Yours truly,

Anthony Fu, EIT
Project Manager

AF:af

Tenderer's Initial_____