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City of Kingston - Third Crossing of the Cataraqui River -  
Parks Canada Environmental Impact Analysis  
Detailed Impact Analysis

## **Appendix C**

# **Sediment Analysis Results 2010-2018**

### **(Hatch - September 2019)**

Table D-1: 2010 Sediment Analysis Results

2010 Borehole No.			SS1	SS2	SS3	SS4	SS5	CS6				CS7				CS8				CS9				CS10						
Parameter	Client Sample ID	Units	CCME (CSQG)		SA1	SA1	SA1	SA1	SA2	SA3	SA4	SA2	SA3	SA4	SA5	SA1	SA2	SA3	SA4	SA1	SA2	SA3	SA4	SA1	SA2	Dup SA2	SA3	SA4		
			ISQG µg/g	PEL µg/g	0.00-0.05	0.00-0.05	0.00-0.05	0.00-0.05	0.00-0.05	0.05-0.12	0.12-0.14	0.16-0.25	0.10-0.15	0.15-0.20	0.20-0.30	0.30-0.40	0.00-0.10	0.10-0.20	0.20-0.30	0.30-0.40	0.00-0.05	0.09-0.14	0.16-0.25	0.25-0.34	0.00-0.05	0.05-0.20	0.05-0.20	0.20-0.30	0.30-0.40	
<b>Physical Tests</b>																														
Moisture	0.1	%	NA	NA	89	86	85	85	74	89	89	89	83	85	87	86	87	83	83	89	87	82	82	82	85	79	80	77	79	
<b>Metals</b>																														
Arsenic (As)	1	ug/g	5.9	17	2	3	8	2	2	4	1	1	<1	5	4	2	1	2	2	2	2	3	4	2	4	4	3	3	3	
Cadmium (Cd)	0.5	ug/g	0.6	3.5	1.1	0.9	1	0.5	0.3	1.4	0.2	0.2	0.1	0.8	0.3	0.2	0.2	0.7	0.8	0.4	0.2	0.6	0.7	0.5	0.4	0.8	1	0.9	0.7	0.6
Chromium (Cr)	1	ug/g	37.3	90	21	35	40	25	20	19	3	2	2	30	11	6	10	31	23	19	7	33	31	26	27	32	26	25	26	28
Copper (Cu)	1	ug/g	35.7	197	29	32	79	27	19	35	6.9	8.9	6.1	36	20	18	17	33	41	30	21	28	30	34	37	31	30	35	30	35
Iron (Fe)	NA	mg/g	NA	NA	20	26	25	18	15	19	5.9	6.4	5.7	26	20	11	8.4	22	19	25	15	21	23	22	24	21	22	21	21	21
Lead (Pb)	1	ug/g	35	91.3	60	47	680	24	15	110	8	2	<1	33	8	3	3	39	35	7	2	33	34	28	26	27	24	25	22	24
Manganese (Mn)	NA	ug/g	NA	NA	810	600	540	1100	390	690	920	980	860	770	940	1200	1100	660	450	690	940	750	610	660	640	790	680	690	650	690
Mercury (Hg)	NA	ug/g	0.17	0.486	0.1	0.08	0.09	0.06	<0.05	0.14	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	0.08	0.06	<0.05	<0.05	0.07	0.07	0.06	0.08	0.08	0.16	0.11	<0.05	<0.05
Nickel (Ni)	1	ug/g	NA	NA	16	22	41	16	15	17	3.6	3	3	22	13	8.7	9.9	18	16	18	12	19	18	20	21	19	19	21	21	21
Zinc (Zn)	5	ug/g	123	315	110	110	2000	77	55	210	17	9	7	94	34	18	30	100	89	61	32	92	90	94	92	98	86	86	86	86
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>																														
Acenaphthene	0.05	ug/g	0.00671	0.0889	<0.1	<0.08	<0.08	<0.08	<0.04	<0.08	<0.1	<0.1	<0.1	0.07	<0.06	<0.08	<0.08	<0.08	<0.06	<0.06	<0.1	<0.08	<0.06	<0.05	<0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	0.05	ug/g	0.00587	0.128	<0.05	<0.04	0.05	<0.04	<0.04	<0.05	<0.05	<0.05	0.98	0.41	<0.04	<0.04	0.04	<0.03	<0.05	<0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Anthracene	0.05	ug/g	0.0469	0.245	<0.05	<0.04	0.04	<0.04	<0.05	<0.05	<0.05	0.05	1.3	0.44	<0.04	<0.04	0.05	<0.03	<0.05	<0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	
Benz(a)anthracene	0.05	ug/g	0.0317	0.385	<0.1	<0.08	0.09	<0.08	0.72	<0.08	<0.1	<0.1	3.3	1.2	<0.08	<0.08	0.15	<0.06	<0.1	<0.08	0.07	<0.05	<0.06	0.07	0.06	<0.05	<0.05	<0.05	<0.05	
Benzol(a)pyrene	0.05	ug/g	0.0319	0.762	0.05	0.05	0.1	0.04	0.76	0.05	<0.05	<0.05	3	1.1	<0.04	<0.04	0.14	<0.03	0.09	0.08	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	
Benzol(b)fluoranthene	0.05	ug/g	NA	NA	<0.1	<0.08	0.13	<0.08	0.88	<0.08	<0.1	<0.1	3.9	1.4	<0.08	<0.08	0.18	<0.06	0.11	0.1	0.06	<0.06	0.11	0.09	0.06	0.05	0.06	0.05	0.06	
Benzol(h,i)perylene	0.05	ug/g	NA	NA	<0.2	<0.2	<0.2	<0.2	0.28	<0.2	<0.2	<0.2	1.1	0.4	<0.2	<0.2	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzol(k)fluoranthene	0.05	ug/g	NA	NA	<0.1	<0.08	0.13	<0.08	0.32	<0.08	<0.1	<0.1	1.4	0.51	<0.08	<0.08	0.06	<0.06	<0.1	<0.08	<									

Table D-2: 2016 Sediment Analysis Results

2016 Borehole No.				BH16-101		BH16-102		BH16-103		BH16-104		BH16-105		BH16-106	
Client Sample ID				SA2	SA3	SA1	SA3	SA1	SA2B	SA1	SA2	SA1	SA3	SA1	SA2
Parameter	Lowest Detection Limit	Units	CCME (CSQG)		Meters Below Sediment Level										
			ISQG (µg/g)	PEL (µg/g)	1.83-2.44	2.44-3.2	1.45-2.1	2.1-2.7	1.5-2.1	2.4-2.7	1.35-1.95	1.95-2.55	1.3-2	2.6-3	1.57-2.2
<b>Metals</b>															
Antimony (Sb)	1	ug/g	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Arsenic (As)	1	ug/g	5.9	17	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Barium (Ba)	1	ug/g	-	-	173	204	179	425	151	504	185	76.3	129	250	187
Beryllium (Be)	0.5	ug/g	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Boron (B)	5	ug/g	-	-	14.7	19.6	13.6	15.3	14.9	11.9	11.7	12.7	7.5	8.3	30.5
Cadmium (Cd)	0.5	ug/g	0.6	3.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium (Cr)	1	ug/g	37.3	90	30.4	34	3.1	70.4	25.5	62.9	31.3	7.1	22.5	44.5	35.4
Cobalt (Co)	1	ug/g	-	-	9.8	11.6	9.6	17.3	7.4	15.8	10.7	2.7	7	12.1	11.5
Copper (Cu)	1	ug/g	35.7	197	28.3	33	26	92.7	23	13.6	31.6	9.2	18.4	25.2	31.5
Hexavalent Chromium			-	-	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Lead (Pb)	1	ug/g	35	91.3	21.8	9.2	21.6	14.5	40.6	14.1	27.4	5	7	8.6	22.4
Mercury (Hg)		ug/g	0.17	0.486	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molybdenum (Mo)	1	ug/g	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nickel (Ni)	1	ug/g	-	-	19.1	22.9	18.7	41.4	15.8	30.5	22.3	8.1	14.8	24.1	21.7
Selenium (Se)	1	ug/g	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Silver (Ag)	0.2	ug/g	-	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Thallium (Tl)	0.5	ug/g	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Uranium (U)	1	ug/g	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vanadium (V)	1	ug/g	-	-	34.2	38	33	67.8	24.9	76.9	35.4	12.4	32.8	54.1	36.2
Zinc (Zn)	5	ug/g	123	315	69	69.2	66.5	122	75.2	96.6	83.4	16.8	54.6	59.3	79.5
<b>Hydrocarbons</b>															
F2 (C10-C16)	10	ug/g	-	-	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
F3 (C16-C34)	50	ug/g	-	-	<8	<8	316	<8	52	<8	<8	<8	560	<8	<8
F4 (C34-C50)	50	ug/g	-	-	<6	<6	<6	<6	6	<6	<6	<6	282	<6	<6
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>															
Acenaphthene	0.05	ug/g	0.00671	0.0889	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	0.05	ug/g	0.00587	0.128	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Anthracene	0.05	ug/g	0.0469	0.245	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	0.05	ug/g	0.0317	0.385	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	0.05	ug/g	0.0319	0.782	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(b)fluoranthene	0.05	ug/g	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(g,h,i)perylene	0.05	ug/g	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(k)fluoranthene	0.05	ug/g	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chrysene	0.05	ug/g	0.0571	0.862	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenzo(ah)anthracene	0.05	ug/g	0.00622	0.135	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	0.05	ug/g	0.111	2.355	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.15
Fluorene	0.05	ug/g	0.0212	0.144	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Indeno(1,2,3-cd)pyrene	0.05	ug/g	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
1-Methylnaphthalene	0.03	ug/g	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
2-Methylnaphthalene	0.03	ug/g	0.0202	0.201	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Methylnaphthalene		ug/g	-	-	<0.0										

2016 Borehole No.				BH16-101		BH16-102		BH16-103		BH16-104		BH16-105		BH16-106	
Client Sample ID				SA2	SA3	SA1	SA3	SA1	SA2B	SA1	SA2	SA1	SA3	SA1	SA2
Parameter	Lowest Detection Limit	Units	CCME (CSQG)		Meters Below Sediment Level										
	ISQG ( $\mu\text{g/g}$ )		PEL ( $\mu\text{g/g}$ )	1.83-2.44	2.44-3.2	1.45-2.1	2.1-2.7	1.5-2.1	2.4-2.7	1.35-1.95	1.95-2.55	1.3-2	2.6-3	1.57-2.2	2.2-2.8
Naphthalene	0.013	ug/g	0.0346	0.391	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	0.046	ug/g	0.419	0.515	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Pyrene	0.05	ug/g	0.053	0.875	0.17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.12

Notes:

NV = No value derived, NA - Not analyzed. NC - Not calculated.

**Bold** Exceeds CCME Interim Sediment Quality Guideline (ISQG)

**Grey Shaded**

Exceeds CCME Probable Effect Levels (PELs)

1: Canadian Council of Ministers of the Environment (CCME) Canadian Sediment Quality Guidelines (CEQG) for the Protection of Aquatic Life: Table 1. Interim freshwater sediment quality guidelines (updated 2002).

**Table D-3: 2018 Sediment Analysis Results**

2018 Borehole No.				BH18-101		BH18-102		BH18-103		BH18-104		BH18-105	
Client Sample ID				SS2	SS7	SS1	SS3	SS1	SS2	SS6	SS7		
Parameter	Lowest Detection Limit	Units	CCME (CSQG)		Meters Below Sediment Level								
			ISQG (µg/g)	PEL (µg/g)	0.72-1.44	5.24-5.96	0-0.3	1.2-1.8	0-0.6	0.6-1.2	3.6-4.2	4.8-5.4	
<b>Physical Tests</b>													
Conductivity	0.004	mS/cm	NA	NA	NA	0.279	0.228	NA	NA	NA	NA	0.52	
Moisture	0.1	%	NA	NA	86.7	32	88.9	25.5	89.4	81.8	23.4	24.3	
pH	0.1	pH units	NA	NA	NA	7.88	6.53	NA	6.33	6.92	7.75	8.31	
Redox Potential	-1000	mV	NA	NA	NA	102	270	NA	NA	NA	NA	143	
Resistivity	1	ohm*cm	NA	NA	NA	3580	4390	NA	NA	NA	NA	1920	
<b>Leachable Anions &amp; Nutrients</b>													
Chloride	5	ug/g	NA	NA	NA	30.9	174	NA	NA	NA	NA	144	
<b>Anions and Nutrients</b>													
Sulphate	20	mg/kg	NA	NA	NA	<20	263	NA	NA	NA	NA	100	
<b>Inorganic Parameters</b>													
Acid Volatile Sulphides	2	mg/kg	NA	NA	NA	3.7	<1.0	NA	NA	NA	NA	<0.20	
<b>Metals</b>													
Antimony (Sb)	1	ug/g	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA	
Arsenic (As)	1	ug/g	5.9	17	NA	NA	NA	NA	NA	2.3	3.3	NA	
Barium (Ba)	1	ug/g	NA	NA	NA	NA	NA	NA	NA	264	346	NA	
Beryllium (Be)	0.5	ug/g	NA	NA	NA	NA	NA	NA	NA	0.83	1.03	NA	
Boron (B)	5	ug/g	NA	NA	NA	NA	NA	NA	NA	9.6	11.8	NA	
Cadmium (Cd)	0.5	ug/g	0.6	3.5	NA	NA	NA	NA	NA	0.54	<0.50	NA	
Chromium (Cr)	1	ug/g	37.3	90	NA	NA	NA	NA	NA	41.2	54.6	NA	
Cobalt (Co)	1	ug/g	NA	NA	NA	NA	NA	NA	NA	14.3	17.1	NA	
Copper (Cu)	1	ug/g	35.7	197	NA	NA	NA	NA	NA	35.7	32.8	NA	
Hexavalent Chromium			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Iron (Fe)		ug/g	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Lead (Pb)	1	ug/g	35	91.3	NA	NA	NA	NA	NA	7.9	8.7	NA	
Manganese (Mn)		ug/g	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Mercury (Hg)		ug/g	0.17	0.486	NA	NA	NA	NA	NA	NA	NA	NA	
Molybdenum (Mo)	1	ug/g	NA	NA	NA	NA	NA	NA	NA	1.1	<1.0	NA	
Nickel (Ni)	1	ug/g	NA	NA	NA	NA	NA	NA	NA	29.7	35.8	NA	
Selenium (Se)	1	ug/g	NA	NA	NA	NA	NA	NA	NA	<1.0	<1.0	NA	
Silver (Ag)	0.2	ug/g	NA	NA	NA	NA	NA	NA	NA	<0.20	<0.20	NA	
Thallium (Tl)	0.5	ug/g	NA	NA	NA	NA	NA	NA	NA	<0.50	<0.50	NA	
Uranium (U)	1	ug/g	NA	NA	NA	NA	NA	NA	NA	1.3	<1.0	NA	
Vanadium (V)	1	ug/g	NA	NA	NA	NA	NA	NA	NA	47	77.4	NA	



2018 Borehole No.				BH18-101		BH18-102		BH18-103		BH18-104		BH18-105	
Client Sample ID				SS2	SS7	SS1	SS3	SS1	SS2	SS6	SS7		
Parameter	Lowest Detection Limit	Units	CCME (CSQG)		Meters Below Sediment Level								
			ISQG (µg/g)	PEL (µg/g)	0.72-1.44	5.24-5.96	0-0.3	1.2-1.8	0-0.6	0.6-1.2	3.6-4.2	4.8-5.4	
Zinc (Zn)	5	ug/g	123	315	NA	NA	NA	NA	NA	93.3	96.2	NA	
<b>Volatile Organic Compounds (VOCs)</b>													
Acetone	0.5	ug/g	NA	NA	<3.8	<0.50	NA	<0.50	NA	<2.0	<0.50	NA	
Benzene	0.0068	ug/g	NA	NA	<0.051	<0.0068	NA	<0.0068	NA	<0.027	<0.0068	NA	
Bromodichloromethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Bromoform	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Bromomethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Carbon tetrachloride	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Chlorobenzene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Dibromochloromethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Chloroform	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,2-Dibromoethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,2-Dichlorobenzene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,3-Dichlorobenzene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,4-Dichlorobenzene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Dichlorodifluoromethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,1-Dichloroethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,2-Dichloroethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,1-Dichloroethylene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
cis-1,2-Dichloroethylene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
trans-1,2-Dichloroethylene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Methylene Chloride	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,2-Dichloropropane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
cis-1,3-Dichloropropene	0.03	ug/g	NA	NA	<0.23	<0.030	NA	<0.030	NA	<0.12	<0.030	NA	
trans-1,3-Dichloropropene	0.03	ug/g	NA	NA	<0.23	<0.030	NA	<0.030	NA	<0.12	<0.030	NA	
1,3-Dichloropropene (cis & trans)	0.042	ug/g	NA	NA	<0.32	<0.042	NA	<0.042	NA	<0.17	<0.042	NA	
Ethylbenzene	0.018	ug/g	NA	NA	<0.14	<0.018	NA	<0.018	NA	<0.070	<0.018	NA	
n-Hexane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Methyl Ethyl Ketone	0.5	ug/g	NA	NA	<3.8	<0.50	NA	<0.50	NA	<2.0	<0.50	NA	
Methyl Isobutyl Ketone	0.5	ug/g	NA	NA	<3.8	<0.50	NA	<0.50	NA	<2.0	<0.50	NA	
MTBE	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Styrene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,1,1,2-Tetrachloroethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,1,2,2-Tetrachloroethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Tetrachloroethylene	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Toluene	0.08	ug/g	NA	NA	<0.60	<0.080	NA	<0.080	NA	<0.31	<0.080	NA	

2018 Borehole No.				BH18-101		BH18-102		BH18-103		BH18-104		BH18-105	
Client Sample ID				SS2	SS7	SS1	SS3	SS1	SS2	SS6	SS7		
Parameter	Lowest Detection Limit	Units	CCME (CSQG)		Meters Below Sediment Level								
			ISQG (µg/g)	PEL (µg/g)	0.72-1.44	5.24-5.96	0-0.3	1.2-1.8	0-0.6	0.6-1.2	3.6-4.2	4.8-5.4	
1,1,1-Trichloroethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
1,1,2-Trichloroethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Trichloroethylene	0.01	ug/g	NA	NA	<0.075	<0.010	NA	<0.010	NA	<0.039	<0.010	NA	
Trichlorofluoromethane	0.05	ug/g	NA	NA	<0.38	<0.050	NA	<0.050	NA	<0.20	<0.050	NA	
Vinyl chloride	0.02	ug/g	NA	NA	<0.15	<0.020	NA	<0.020	NA	<0.078	<0.020	NA	
o-Xylene	0.02	ug/g	NA	NA	<0.15	<0.020	NA	<0.020	NA	<0.078	<0.020	NA	
m+p-Xylenes	0.03	ug/g	NA	NA	<0.23	<0.030	NA	<0.030	NA	<0.12	<0.030	NA	
Xylenes (Total)	0.05	ug/g	NA	NA	<0.27	<0.050	NA	<0.050	NA	<0.14	<0.050	NA	
4-Bromofluorobenzene		%	NA	NA	71.2	105.8	NA	98.7	NA	70.4	98.2	NA	
1,4-Difluorobenzene		%	NA	NA	81	112.6	NA	111.2	NA	84.6	115.6	NA	
<b>Hydrocarbons</b>													
F1 (C6-C10)	5	ug/g	NA	NA	<38	<5.0	NA	<5.0	NA	<20	<5.0	NA	
F1-BTEX	5	ug/g	NA	NA	<38	<5.0	NA	<5.0	NA	<20	<5.0	NA	
F2 (C10-C16)	10	ug/g	NA	NA	<75	<10	NA	<10	<75	<50	<10	NA	
F2-Naphth	10	ug/g	NA	NA	NA	NA	NA	NA	NA	<50	<10	NA	
F3 (C16-C34)	50	ug/g	NA	NA	<380	<50	NA	<50	<380	<250	<50	NA	
F3-PAH	50	ug/g	NA	NA	NA	NA	NA	NA	NA	<250	<50	NA	
F4 (C34-C50)	50	ug/g	NA	NA	<380	<50	NA	<50	<380	<250	<50	NA	
Total Hydrocarbons (C6-C50)	72	ug/g	NA	NA	<540	<72	NA	<72	NA	<360	<72	NA	
Chrom. to baseline at nC50		-	NA	NA	YES	YES	NA	YES	YES	YES	YES	NA	
2-Bromobenzotrifluoride		%	NA	NA	94	91.1	NA	68.8	96.9	89.9	91.4	NA	
3,4-Dichlorotoluene		%	NA	NA	53.8	93	NA	83.9	NA	57.8	81.7	NA	
<b>Polycyclic Aromatic Hydrocarbons (PAHs)</b>													
Acenaphthene	0.05	ug/g	0.00671	0.0889	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Acenaphthylene	0.05	ug/g	0.00587	0.128	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Anthracene	0.05	ug/g	0.0469	0.245	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Benzo(a)anthracene	0.05	ug/g	0.0317	0.385	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Benzo(a)pyrene	0.05	ug/g	0.0319	0.782	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Benzo(b)fluoranthene	0.05	ug/g	-	-	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Benzo(g,h,i)perylene	0.05	ug/g	-	-	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Benzo(k)fluoranthene	0.05	ug/g	-	-	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Chrysene	0.05	ug/g	0.0571	0.862	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Dibenzo(ah)anthracene	0.05	ug/g	0.00622	0.135	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Fluoranthene	0.05	ug/g	0.111	2.355	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Fluorene	0.05	ug/g	0.0212	0.144	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
Indeno(1,2,3-cd)pyrene	0.05	ug/g	-	-	NA	NA	NA	NA	NA	<0.25	<0.050	NA	

2018 Borehole No.				BH18-101		BH18-102		BH18-103		BH18-104		BH18-105	
Client Sample ID				SS2	SS7	SS1	SS3	SS1	SS2	SS6	SS7		
Parameter	Lowest Detection Limit	Units	CCME (CSQG)		Meters Below Sediment Level								
			ISQG (µg/g)	PEL (µg/g)	0.72-1.44	5.24-5.96	0-0.3	1.2-1.8	0-0.6	0.6-1.2	3.6-4.2	4.8-5.4	
1+2-Methylnaphthalenes	0.042	ug/g	-	-	NA	NA	NA	NA	NA	<0.21	<0.042	NA	
1-Methylnaphthalene	0.03	ug/g	-	-	NA	NA	NA	NA	NA	<0.15	<0.030	NA	
2-Methylnaphthalene	0.03	ug/g	0.0202	0.201	NA	NA	NA	NA	NA	<0.15	<0.030	NA	
Naphthalene	0.013	ug/g	0.0346	0.391	NA	NA	NA	NA	NA	<0.065	<0.013	NA	
Phenanthrene	0.046	ug/g	0.419	0.515	NA	NA	NA	NA	NA	<0.23	<0.046	NA	
Pyrene	0.05	ug/g	0.053	0.875	NA	NA	NA	NA	NA	<0.25	<0.050	NA	
2-Fluorobiphenyl		%	-	-	NA	NA	NA	NA	NA	77.5	80.1	NA	
p-Terphenyl d14		%	-	-	NA	NA	NA	NA	NA	74.8	79.6	NA	

Notes:

NV = No value derived, NA - Not analyzed. NC - Not calculated.

**Bold** Exceeds CCME Interim Sediment Quality Guideline (ISQG)

**Grey Shaded** Exceeds CCME Probable Effect Levels (PELs)

1: Canadian Council of Ministers of the Environment (CCME) Canadian Sediment Quality Guidelines (CEQG) for the Protection of Aquatic Life: Table 1. Interim freshwater sediment quality guidelines (updated 2002).