

D.R. Clough Consulting

Fisheries Resource Consultants

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Oct. 31, 2018

Attn: Ken Watson, Project Manager
On behalf of City of Port Alberni
4850 Argyle Street, Port Alberni
British Columbia, V9Y 1V8

RE: Sediment and Water Sampling Results – McLean Mill Pond

Introduction

On September 19, 2018 there was a dewatering of the Mclean Mill Pond during maintenance of the faulty valve on the dyke. The result was a release of pond water and sediments. Under our direction, TerraWest Environmental Ltd. conducted sediment and water samples on September 26, 2018. This report covers the sampling on that date.

Results

Sediment and Water Sampling Report

Attached is the report by TerraWest Environmental Ltd. dated October 30, 2018. This report provides the results of sampling in three Water and Soil sample locations. The sample locations were determined based on possible sources of contaminants on east and west side of the Mill pond as well in the centre of the pond just above the location of the discharge. A broad spectrum of analysis of potential contaminants was analyzed; The Sediment tests surveyed for; 27 Hydrocarbons, 31 Metals, six Chlorphenols, 12 Dioxins and 17 Furans. The Water was sampled for 30 Hydrocarbons, 29 Metals as well as seven Routine Parameters.

The results were compared against Contaminated Sites Regulation (CSR) Schedule 3.4 Generic Numerical Sediment Criteria for freshwater sensitive sediment and Schedule 3.2 Generic Numerical Water Standards for freshwater aquatic life, irrigation, livestock and drinking water use.

The Sediment sampling identified 12 exceedances in the 279 tests (93 per 3 sites). The exceedances were metals in the soils amongst all three sites and additionally for Chlorphenol and Dioxins/Furans at a single site (SS18-01). The exceedances ranged from 6% (Dioxin/Furans) to 275% (Acenaphthylene & Mercury) above the CSR for Sensitive Sediment.

In Water sampling, there were 177 relevant samples for CSR schedules. The exceedances were only in Cobalt. The Cobalt exceedances in all three sites ranging from 170 to 200% above the CSR for Drinking Water but well below the CSR for other uses including Aquatic Life and Agricultural uses.

Discussion

Exceedances

There are contaminated soil and water samples on the site. There were 93 Sediment sample parameters, 9 were found in exceedances in at least one site. The exceedances ranged from 6% to 275% using the CSR sensitive soils criteria; Mercury and Acenaphthylene were the highest in soils. In water; of the 59 tests, only Cobalt was high at all three sites.

Sample Sites:

The three September 26, 2018 sample sites were selected for being in or along the edge of the Mill Pond since it was the site that had released the water and suspended sediments. The sites were located approximately 60 m apart. Results now indicate contamination in all three, thus a further outward radius of sampling would be needed to determine the limits of contamination. Further sampling may also determine the source of contamination.

Sampling Error

There were some sampling disparities. When duplicate samples were compared and two metals; titanium and aluminum were 151% and 165% in skew with their other sample. More sampling will be needed to confirm these two variances.

Other Water Sampling

The Mclean Mill and Kitsuksis Creek have been surveyed for water quality by other means and organizations. A chronological bibliography of references provided by various groups and individuals is presented below, it is likely not a complete list;

- 1994, October – Envirochem Special Projects Inc. McLean Mill National Historic Site, Port Alberni B.C. Contamination Assessment. For City of Port Alberni. *This is a detailed survey of the Soil and water at the Mill site.*
- 1995, July. Envirochem Special Projects Inc. Soil Remediation Summary, Mclean Mill National Historic Site, Port Alberni B.C. For City of Port Alberni. *A soil remediation report.*
- 2017, March, Envirochem Services Inc. Environmental Review and Opinion, Mclean Mill National Historic Site. For City of Port Alberni. *A reply to public concerns about contamination.*
- 2017, February. West Coast Aquatic Stewardship association. Clean Water in Alberni Inlet; A study of the water Quality and Marine Environments in the Alberni Inlet. *Water chemistry analysis of the Alberni Area streams and inlet.*
- 2018, Sep 21, - MB Labs Ltd. Water Sample Report 4 sites at and below Mclean Mill. By Port Alberni City. *Broad spectrum lab analysis at 4 sites.*

Recommendations

Given there are exceedances in water and sediment samples. There is good cause to consider further sampling. But before further sampling is done, a review of the existing data is recommended in the fashion of a Phase 1 environmental review as suggested by our water quality experts at Terra West Ltd. As they have said in their report, collecting this information and analyzing it before declaring the sampling actions makes sense.

There are funds available for assistance to the City of Port Alberni to assist in the investigations, sampling and possible remediation. The Green Municipal Fund offers grants that may cover plans, feasibility studies, pilot projects and capital projects. (<https://fcm.ca/home/programs/green-municipal-fund/what-we->

fund/eligibility/brownfields-funding.htm). Given the high environmental value of the Mclean Mill to the salmon community, there are funds such as the Pacific Salmon Community Salmon Fund and Royal Bank Blue Water fund that have helped with water studies in the past.

The Mclean Mill site through the years has been an example of collaborative partnerships with the City of Port Alberni, public service organizations (i.e. AVEA, West Coast Aquatic, Mclean Mill Historic Society,) as well as other levels of government and individuals. If this current situation can be called a problem, then I think that the people that care about the McLean Mill, and the Environment will achieve a solution.

sincerely

A handwritten signature in black ink, appearing to read "David R. Clough". The signature is fluid and cursive, with the first name "David" being more prominent.

David R. Clough, RPBio.

Mailing

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D.R. Clough Consulting
6966 Leland Road, Lantzville, B.C.
C.C., V0R 2H0

October 30, 2018

Attn: David R. Clough, R.P.Bio.

Re: **SEDIMENT AND WATER SAMPLING RESULTS** – McLean Mill

TerraWest Environmental Inc. (TerraWest) was retained by D.R. Clough Consulting (the 'Client') to complete sediment and surface water sampling at 5633 Smith Road, Port Alberni, BC, herein referred to as the 'Subject Property' and/or the 'Site'. Historical industrial activities were previously identified on the Site including a lumber mill. Currently the Site is a historical park. TerraWest was supplied with an identified investigation area which, encompassed the mill's pond, and designated sample locations supplied from D.R. Clough Consulting, see Figure 1 and Figure 2.

1.0 FIELD ACTIVITIES

Sediment samples were obtained at three designated sampling locations by extending a hand auger into the benthos of the mill's pond and collecting approximately the top 20 cm to 40 cm of sediment. Captured water was carefully drained from the hand auger prior to sampling. Sediment was extracted from the hand auger and placed into laboratory-supplied 120 mL soil jars, along with 40 mL vials using designated soil plugs containing methanol preservative. The equipment was rinsed in the pond water at the sample location in attempt to minimize potential cross-contamination between other sample locations.

Surface water samples were collected at three designated sampling locations utilizing laboratory-supplied bottles that were filled to capacity by plunging the bottle directly into the water with the opening of the bottle downwards first, then tipping upwards within the water column allowing air bubbles to escape.

Photographs of the sediment and surface water sampling locations are attached to this letter.

Sediment samples were analyzed by Exova for potential contaminants of concern (PCOCs) including benzene, toluene, ethylbenzene, total xylenes, methyl tertiary butyl ether, styrene (BTEXSM), light extractable petroleum hydrocarbons (LEPH), heavy extractable petroleum hydrocarbons (HEPH), volatile petroleum hydrocarbons (VPH), polycyclic aromatic hydrocarbons (PAH), metals, polychlorinated phenols, dioxins and furans.

Surface water samples were analyzed by Exova for PCOCs including BTEXSM, EPH, VPH, LEPH/HEPH, PAHs and metals.

2.0 STANDARDS

Laboratory analytical results were compared to the BC Ministry of Environment and Climate Change *Contaminated Sites Regulation* (CSR) Schedule 3.4 Generic Numerical Sediment Criteria for freshwater sensitive sediment and Schedule 3.2 Generic Numerical Water Standards for freshwater aquatic life, irrigation, livestock, and drinking water use, herein referred to as the 'applicable standards'.

3.0 RESULTS

A summary of analytical results is presented in the Tables 1 through 8, attached.

3.1 SEDIMENT ANALYTICAL RESULTS

Laboratory analytical results indicated the sediment sample(s) reported concentrations exceeding the lowest applicable standards:

Sample ID	Parameter	Concentration	CSR Schedule 3.4 Freshwater Sediment	
			Sensitive Sediment*	Typical Sediment*
SS18-01	Acenaphthylene	0.22 ug/g	0.08 ug/g	0.15 ug/g
	Naphthalene	0.63 ug/g	0.24 ug/g	0.47 ug/g
	Phenanthrene	0.44 ug/g	0.32 ug/g	0.62 ug/g
	Arsenic	19 ug/g	11 ug/g	20 ug/g
	Chromium (Total)	90 ug/g	56 ug/g	110 ug/g
	Mercury	0.81 ug/g	0.3 ug/g	0.58 ug/g
	Zinc	280 ug/g	200 ug/g	380 ug/g
	Total Equivalency, polychlorinated dioxins and furans (PDCC and PCDF)	0.13840 ug/kg	0.13 ug/kg	0.26 ug/kg

SS18-02	Arsenic	12 ug/g	11 ug/g	20 ug/g
	Chromium (Total)	90 ug/g	56 ug/g	110 ug/g
	Mercury	0.34 ug/g	0.3 ug/g	0.58 ug/g
SS18-03	Chromium (Total)	96 ug/g	56 ug/g	110 ug/g
	Mercury	0.33 ug/g	0.3 ug/g	0.58 ug/g

* As per the BC CSR definitions. Sensitive Sediment standards apply; Typical Sediment standards are shown for comparative purposes only.

All other analyzed parameters were below the applicable standards.

3.2 SURFACE WATER ANALYTICAL RESULTS

Laboratory analytical results indicated the following surface water sample(s) reported concentrations exceeding the lowest applicable standards:

Sample ID	Parameter	Concentration	CSR Schedule 3.2			
			FW AQ ¹	IR ²	LS ³	DW ⁴
SW18-01	Cobalt	1.7 ug/L	40 ug/L	50 ug/L	1,000 ug/L	1 ug/L
SW18-02/ SW18-02A*	Cobalt	1.9 ug/L	40 ug/L	50 ug/L	1,000 ug/L	1 ug/L
	Cobalt	2.0 ug/L	40 ug/L	50 ug/L	1,000 ug/L	1 ug/L
SW18-03	Cobalt	1.7 ug/L	40 ug/L	50 ug/L	1,000 ug/L	1 ug/L

Notes:

* Represents duplicate sample

1 – Freshwater Aquatic Life 2 – Irrigation 3 – Livestock 4 – Drinking Water

All other analyzed parameters were below the applicable standards.

3.3 RELATIVE PERCENT DIFFERENCE ON DUPLICATE SAMPLES

A relative percent difference (RPD) value for surface water samples of less than 20% is generally considered an indicator of acceptable sampling and analytical precision, as per the British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples. The BC Field Sampling Manual also specifies that RPD values between 20% and 50% may indicate an issue with sampling or analytical precision. It should be noted that as per the BC Field Sampling Manual, the values must be greater than five times the method detection limit to be included in the RPD calculation.

The RPD between the surface water sample SS18-02 and duplicate sample SS18-02A exceeded the 20% and 50% guidelines for aluminum at 151% and titanium at 165%

All precautions were taken in the field to ensure integrity of samples was maintained and the potential for cross-contamination between samples was minimized. As reported in the laboratory analytical reports, all samples met Exova quality assurance and quality control standards. The exact reason why the RPD values exceeded the guideline is not known.

4.0 CONCLUSIONS & RECOMMENDATIONS

Laboratory analytical results indicated exceedances of applicable standards in both sediment and surface water samples obtained from the mill pond. Based on the findings of this sampling program, TerraWest recommends further delineation works be conducted to determine if sediment and surface water impacts extend beyond the initial sample locations. Additionally, TerraWest recommends an assessment of the wider mill property and historical uses to attempt to identify the source of the contaminants currently identified in the pond, in addition to full review of all historic reports provided by DR Clough Consulting on October 23, 2018.

5.0 LIMITATIONS & CLOSURE

TerraWest Environmental Inc. has prepared this report for the exclusive use of its Client, D.R. Clough Consulting, and may be relied upon by the Client for their private business purposes. Any other third party use of this report, or reliance placed on it, or decisions taken based on it, is the responsibility of such parties. TerraWest accepts no responsibility for any damages suffered by any third party, or any claims made by any third party as a result of decisions made or actions taken, based on this report. This report does not constitute any expression of legal opinion, and D.R. Clough Consulting is specifically advised to seek professional legal opinions with respect to applicable regulatory statutes in this matter.

Investigations described by this report were initiated on the Subject Property at the request of the Client. TerraWest's investigations were conducted in accordance with generally accepted practices of such environmental investigations. No other warranties are made, either expressed or implied.

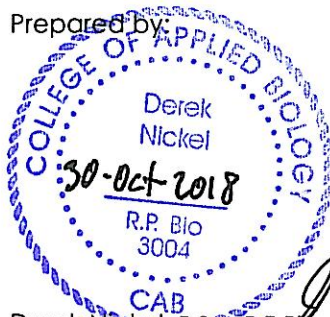

The findings of this report are partially based on information provided to TerraWest by the Client and other individuals or organizations. While TerraWest believes that information was provided in good faith and has attempted to verify such information where possible, TerraWest does not accept any responsibility for any inaccuracies, deficiencies or omissions contained in this report, based on the use of such information.

These report findings are partially based on TerraWest's observations of Site environmental conditions, limited to the dates and specific locations of investigation. TerraWest offers no warranty, either expressed or implied, as to the presence or potential presence of any chemical substances or contamination on the Subject Property covered by this report. This report constitutes neither an endorsement nor a condemnation of the Subject Property.

A signed paper copy of this report constitutes the official and complete deliverable document of record in this matter. The complete report includes the main report text, Attachments and Appendices, as identified in the Table of Contents. Should this report be distributed by means of digital transmission, or copied in paper hardcopy form, TerraWest accepts no liability for the completeness, accuracy or digital compatibility of the files provided.

We trust this meets your requirements, and if there are any questions regarding the above please do not hesitate to contact the undersigned below.

Prepared by:



Derek Nickel, B.Sc., R.P.Bio.
Project Biologist

Reviewed by:



Suzanne Durnin, P.Ag.
QA/QC Manager

Enclosures:

Site Inspection Photographs

Figure 1. Site Location

Figure 2. Site Plan with Sample Locations

Table 1. Summary of Sediment Analytical Results – Petroleum Hydrocarbons

Table 2. Summary of Sediment Analytical Results – Metals

Table 3. Summary of Sediment Analytical Results – Phenols

Table 4. Summary of Sediment Analytical Results – Dioxins and Furans

Table 5. Summary of Surface Water Analytical Results - Petroleum Hydrocarbons

Table 6. Summary of Surface Water Analytical Results - Metals

Table 7. Summary of Surface Water Analytical Results – Routine Parameters

Table 8. Relative Percent Difference of Field Duplicate Samples

Laboratory Analytical Report



Photo 1. Looking west towards SS18-01 (bottom left corner) and mill pond.



Photo 2. Looking northeast towards mill pond outlet.

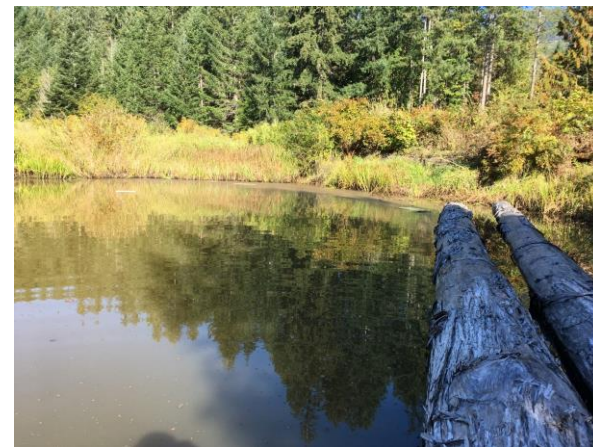


Photo 3. Looking north towards SS18-02 in mill pond.



Photo 4. Looking at sediment sample from SS18-02.



Photo 5. Looking east towards SS18-03 in mill pond.



Photo 6. Looking east from SS18-03 over mill pond.

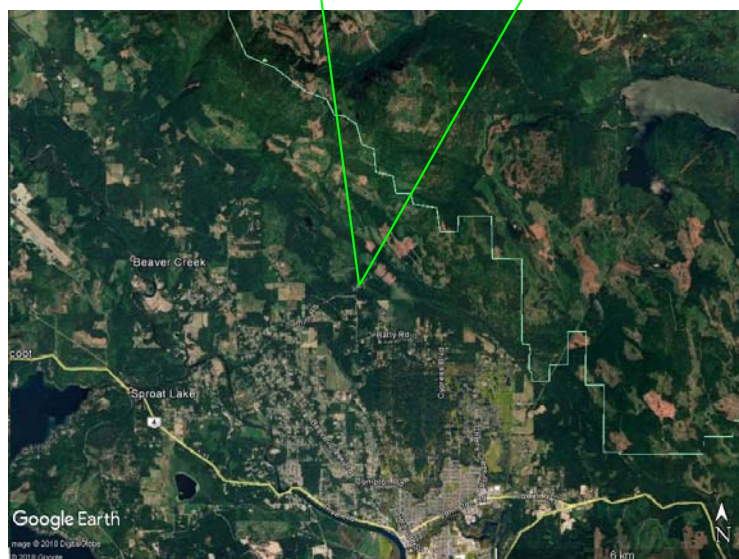


FIGURE 1. SITE LOCATION

CLIENT: D.R. CLOUGH CONSULTING
 LOCATION: 5633 SMITH ROAD, PORT ALBERNI, BC
 PROJECT: DCMM18-01
 DATE: OCTOBER 2018
 CREATED BY: DNICKEL

LEGEND

--- SITE BOUNDARY

THIS FIGURE IS SUBJECT TO THE SAME LIMITATIONS OUTLINED IN THE REPORT BODY.
 THIS FIGURE IS FOR INTERPRETATION ONLY AND IS INTENDED TO BE VIEWED IN COLOUR ON 8 1/2"x11" SIZED PAPER.
 THE BOUNDARIES AND SCALE DEPICTED ARE APPROXIMATE.
 SOURCE: GOOGLE EARTH



FIGURE 2. SITE PLAN WITH SAMPLE LOCATIONS

CLIENT: D.R. CLOUGH CONSULTING
LOCATION: 5633 SMITH ROAD, PORT ALBERNI, BC
PROJECT: DCMM18-01
DATE: OCTOBER 2018
CREATED BY: DNICKEL

LEGEND

- SITE BOUNDARY
- SEDIMENT SAMPLE LOCATION
- ⊙ SURFACE WATER SAMPLE LOCATION
- SAMPLE EXCEEDS LOWEST APPLICABLE STANDARDS

THIS FIGURE IS SUBJECT TO THE SAME LIMITATIONS OUTLINED IN THE REPORT BODY.
THIS FIGURE IS FOR INTERPRETATION ONLY AND IS INTENDED TO BE VIEWED IN COLOUR ON 11"x17" SIZED PAPER.
THE BOUNDARIES AND SCALE DEPICTED ARE APPROXIMATE.
SOURCE: GOOGLE EARTH

Table 1. Summary of Sediment Analytical Results – Petroleum Hydrocarbons

Sample ID		SS18-01	SS18-02	SS18-03	CSR Schedule 3.4 ²	
Matrix		Sediment	Sediment	Sediment	Freshwater Sediment	
Depth (m below surface grade)		0.0-0.4	0.0-0.4	0.0-0.4		
Sample Date		26-Sep-18	26-Sep-18	26-Sep-18	Sensitive Sediment ³	Typical Sediment ³
Comments		Pond	Pond	Pond		
PARAMETERS	Units	Analytical Results ¹				
Volatile Hydrocarbons						
Benzene	ug/g	<0.02	<0.02	<0.02	n.s.	n.s.
Toluene	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Ethylbenzene	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Total Xylenes (m,p,o)	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Styrene	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Methyl t-Butyl Ether	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Volatile Petroleum Hydrocarbons						
VH ₅₆₋₁₀	ug/g	<50	<50	<50	n.s.	n.s.
Extractable Petroleum Hydrocarbons						
LEPH ₁₀₋₁₉	ug/g	49	25	<20	n.s.	n.s.
HEPH ₁₉₋₃₂	ug/g	1380	348	156	n.s.	n.s.
Polycyclic Aromatic Hydrocarbons						
Acenaphthene	ug/g	<0.03	<0.03	<0.03	0.055	0.11
Acenaphthylene	ug/g	<u>0.22</u>	<0.03	<0.03	0.08	0.15
Anthracene	ug/g	<0.03	<0.03	<0.03	0.15	0.29
Benzo(a)anthracene	ug/g	<0.03	0.08	0.06	0.24	0.46
Benzo(a)pyrene	ug/g	<0.03	<0.03	<0.03	0.48	0.94
Benzo(b+j)fluoranthene	ug/g	<0.06	<0.06	<0.06	n.s.	n.s.
Benzo(g,h,i)perylene	ug/g	<0.03	<0.03	<0.03	n.s.	n.s.
Benzo(k)fluoranthene	ug/g	<0.03	<0.03	<0.03	n.s.	n.s.
Chrysene	ug/g	<0.03	<0.03	<0.03	0.53	1.0
Dibenz(a,h)anthracene	ug/g	<0.03	<0.03	<0.03	0.084	0.16
Fluoranthene	ug/g	0.3	0.07	0.07	1.5	2.8
Fluorene	ug/g	<0.03	<0.03	<0.03	0.089	0.17
Indeno(1,2,3-c,d)pyrene	ug/g	<0.03	<0.03	<0.03	n.s.	n.s.
2-Methylnaphthalene	ug/g	<0.03	<0.03	<0.03	0.12	0.24
Naphthalene	ug/g	<u>0.63</u>	<0.03	<0.03	0.24	0.47
Phenanthrene	ug/g	<u>0.44</u>	0.10	0.06	0.32	0.62
Pyrene	ug/g	0.28	<0.03	<0.03	0.54	1.1
Total PAH	ug/g	2.11	0.55	0.49	10.0	20.0

Notes:

1 - Data excerpted from Exova analytical reports; units as indicated

2 - BC Contaminated Sites Regulation (CSR) Schedule 3.4 Generic Numerical Sediment Standards, site-specific pathways as noted above

3 - As per the BC CSR definitions

n.s. = No applicable standard

< = Less than the laboratory method detection limit

Total PAH is the results for following 13 individual PAHs (acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene and pyrene)

Bold, underlined, and shaded grey indicates concentration exceeds lowest of the applicable standards

Table 2. Summary of Sediment Analytical Results – Metals

Sample ID		SS18-01	SS18-02	SS18-03	CSR Schedule 3.4 ²	
Matrix		Sediment	Sediment	Sediment	Freshwater Sediment	
Depth (m below surface grade)		0.0-0.4	0.0-0.4	0.0-0.4		
Sample Date		26-Sep-18	26-Sep-18	26-Sep-18	Sensitive Sediment ³	Typical Sediment ³
Comments		Pond	Pond	Pond		
PARAMETERS	Units	Analytical Results ¹				
Metals						
Aluminum	ug/g	25000	27000	27000	n.s.	n.s.
Antimony	ug/g	5.1	5.6	5.7	n.s.	n.s.
Arsenic	ug/g	<u>19</u>	<u>12</u>	11	11.0	20.0
Barium	ug/g	110	130	160	n.s.	n.s.
Beryllium	ug/g	0.40	0.44	0.47	n.s.	n.s.
Cadmium	ug/g	0.55	0.3	0.3	2.2	4.2
Calcium	ug/g	7300	11000	9700	n.s.	n.s.
Chromium (Total)	ug/g	<u>90</u>	<u>90</u>	<u>96</u>	56.0	110.0
Cobalt	ug/g	24	27	29	n.s.	n.s.
Copper	ug/g	94	99	96	120.0	240.0
Iron	ug/g	44000	42000	44000	n.s.	n.s.
Lead	ug/g	15	8.4	4	57.0	110.0
Lithium	ug/g	13	14	16	n.s.	n.s.
Magnesium	ug/g	6900	8000	8300	n.s.	n.s.
Manganese	ug/g	420	660	460	n.s.	n.s.
Mercury	ug/g	<u>0.81</u>	<u>0.34</u>	<u>0.33</u>	0.3	0.58
Molybdenum	ug/g	0.4	<0.10	<0.10	n.s.	n.s.
Nickel	ug/g	42	42	45	n.s.	n.s.
Phosphorus	ug/g	1400	580	510	n.s.	n.s.
Potassium	ug/g	680	760	760	n.s.	n.s.
Selenium	ug/g	2	0.6	1	n.s.	n.s.
Silicon	ug/g	570	430	390	n.s.	n.s.
Silver	ug/g	1.5	0.81	0.5	n.s.	n.s.
Sodium	ug/g	140	170	150	n.s.	n.s.
Strontium	ug/g	19	23	25	n.s.	n.s.
Thallium	ug/g	<0.5	<0.5	<0.5	n.s.	n.s.
Tin	ug/g	2	1	0.8	n.s.	n.s.
Titanium	ug/g	1000	1300	1100	n.s.	n.s.
Vanadium	ug/g	150	150	160	n.s.	n.s.
Zinc	ug/g	<u>280</u>	130	97	200.0	380.0
Zirconium	ug/g	5.8	6.2	5.5	n.s.	n.s.

Notes:
1 - Data excerpted from Exova analytical reports; units as indicated
2 - BC Contaminated Sites Regulation (CSR) Schedule 3.4 Generic Numerical Sediment Standards, site-specific pathways as noted above
3 - As per the BC CSR definitions
n.s. = No applicable standard
< = Less than the laboratory method detection limit
Bold, underlined, and shaded grey indicates concentration exceeds lowest of the applicable standards

Table 3. Summary of Sediment Analytical Results – Phenols

Sample ID		SS18-01	SS18-02	SS18-03	CSR Schedule 3.4 ²	
Matrix		Sediment	Sediment	Sediment	Freshwater Sediment	
Depth (m below surface grade)		0.0-0.4	0.0-0.4	0.0-0.4		
Sample Date		26-Sep-18	26-Sep-18	26-Sep-18	Sensitive Sediment ³	Typical Sediment ³
Comments		Pond	Pond	Pond		
PARAMETERS	Units	Analytical Results ¹				
Chlorinated Phenols						
Monochlorophenols	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Dichlorophenols	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Trichlorophenols	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Tetrachlorophenols	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.
Pentachlorophenol	ug/g	<0.02	<0.02	<0.02	0.4	0.8
Total Chlorophenols	ug/g	<0.05	<0.05	<0.05	n.s.	n.s.

Notes:

1 - Data excerpted from Exova analytical reports; units as indicated

2 - BC Contaminated Sites Regulation (CSR) Schedule 3.4 Generic Numerical Sediment Standards, site-specific pathways as noted above

3 - As per the BC CSR definitions

n.s. = No applicable standard

< = Less than the laboratory method detection limit

Bold, underlined, and shaded grey indicates concentration exceeds lowest of the applicable standards

Table 4. Summary of Sediment Analytical Results – Dioxins and Furans

Sample ID		SS18-01	SS18-02	SS18-03	CSR Schedule 3.4	
Matrix		Sediment	Sediment	Sediment	Freshwater Sediment	
Depth (m below surface grade)		0.0-0.4	0.0-0.4	0.0-0.4		
Sample Date		26-Sep-18	26-Sep-18	26-Sep-18	Sensitive Sediment ³	Typical Sediment ³
Comments		Pond	Pond	Pond		
PARAMETERS	Units	Analytical Results ¹				
Dioxins						
2,3,7,8-TCDD	ng/kg	2.1	n.d.	n.d.	n.s.	n.s.
Total TCDD	ng/kg	30	2.9	2.1	n.s.	n.s.
1,2,3,7,8-PeCDD	ng/kg	32	2.6	n.d.	n.s.	n.s.
Total PeCDD	ng/kg	140	2.9	n.d.	n.s.	n.s.
1,2,3,4,7,8-HxCDD	ng/kg	76	n.d.	n.d.	n.s.	n.s.
1,2,3,6,7,8-HxCDD	ng/kg	210	5.4	n.d.	n.s.	n.s.
1,2,3,7,8,9-HxCDD	ng/kg	81	2.7	1.3	n.s.	n.s.
Total HxCDD	ng/kg	1100	45	28	n.s.	n.s.
1,2,3,4,6,7,8-HpCDD	ng/kg	3800	140	41	n.s.	n.s.
Total HpCDD	ng/kg	7200	350	89	n.s.	n.s.
OCDD	ng/kg	11000	1300	320	n.s.	n.s.
Toxic Equivalency*	ng/kg	112	5.5	1.2	n.s.	n.s.
	ug/kg (ppb)	0.1120	0.0055	0.001	n.s.	n.s.
Furans						
2,3,7,8-TCDF	ng/kg	4.2	n.d.	n.d.	n.s.	n.s.
Total TCDF	ng/kg	88	17	8.2	n.s.	n.s.
1,2,3,7,8-PeCDF	ng/kg	7.2	0.72	n.d.	n.s.	n.s.
2,3,4,7,8-PeCDF	ng/kg	9.7	1.2	n.d.	n.s.	n.s.
Total PeCDF	ng/kg	280	19	25	n.s.	n.s.
1,2,3,4,7,8-HxCDF	ng/kg	31	1.1	n.d.	n.s.	n.s.
1,2,3,6,7,8-HxCDF	ng/kg	30	1.9	0.94	n.s.	n.s.
1,2,3,7,8,9-HxCDF	ng/kg	14	n.d.	n.d.	n.s.	n.s.
2,3,4,6,7,8-HxCDF	ng/kg	54	2.6	0.78	n.s.	n.s.
Total HxCDF	ng/kg	870	32	14	n.s.	n.s.
1,2,3,4,6,7,8-HpCDF	ng/kg	830	27	6.1	n.s.	n.s.
1,2,3,4,7,8,9-HpCDF	ng/kg	95	2.4	0.8	n.s.	n.s.
Total HpCDF	ng/kg	3600	110	23	n.s.	n.s.
OCDF	ng/kg	2000	91	18	n.s.	n.s.
Toxic Equivalency*	ng/kg	26	1.3	0.47	n.s.	n.s.
	ug/kg (ppb)	0.026	0.001	0.0005	n.s.	n.s.
Total Equivalency, polychlorinated dioxins and furans (PDCC and PCDF)*	ug/kg (ppb)	0.13840	0.00678	0.00170	0.13**	0.26**

Notes:

1 - Data excerpted from Exova analytical reports; units as indicated

2 - BC Contaminated Sites Regulation (CSR) Schedule 3.4 Generic Numerical Sediment Standards, site-specific pathways as noted above

n.d. = Less than the laboratory method detection limit

n.s. = No applicable standard

*Calculated based on World Health Organization Toxic Equivalency System (WHO-TEQs)

** = Standard has been converted to ug/kg to correspond with laboratory results

Bold, underlined, and shaded grey indicates concentration exceeds lowest of the applicable standards

Table 5. Summary of Surface Water Analytical Results - Petroleum Hydrocarbons

Sample ID		SS18-01	SS18-02	SS18-03	CSR Schedule 3.2 ²			
Matrix		Surface Water	Surface Water	Surface Water				
Sample Date		26-Sep-18	26-Sep-18	26-Sep-18	Freshwater Aquatic Life	Irrigation	Livestock	Drinking Water
Comments		Pond	Pond	Pond				
PARAMETERS	Units	Analytical Results ¹						
Mono-Aromatic Hydrocarbons								
Benzene	ug/L	<0.5	<0.5	<0.5	400	n.s.	n.s.	5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5	2,000	n.s.	n.s.	140
Methyl t-Butyl Ether	ug/L	<0.5	<0.5	<0.5	34,000	n.s.	11,000	95
Styrene	ug/L	<0.5	<0.5	<0.5	720	n.s.	n.s.	800
Toluene	ug/L	<0.5	<0.5	<0.5	5	n.s.	n.s.	60
Total Xylenes (m,p,o)	ug/L	<0.5	<0.5	<0.5	300	n.s.	n.s.	90
Volatile Petroleum Hydrocarbons								
VPHw(VHW ₆₋₁₀ minus BTEX)	ug/L	<50	<50	<50	1,500	n.s.	n.s.	n.s.
VHW6-10	ug/L	<50	<50	<50	15,000	15,000	15,000	15,000
Extractable Hydrocarbons								
EPH _{w10-19}	ug/L	<200	<200	<200	5,000	5,000	5,000	5,000
LEPHw	ug/L	<200	<200	<200	500	n.s.	n.s.	n.s.
EPH _{w19-32}	ug/L	<200	<200	<200	n.s.	n.s.	n.s.	n.s.
HEPHw	ug/L	<200	<200	<200	n.s.	n.s.	n.s.	n.s.
Polycyclic Aromatic Hydrocarbons								
Acenaphthene	ug/L	<0.1	<0.1	<0.1	60	n.s.	n.s.	250
Acenaphthylene	ug/L	<0.1	<0.1	<0.1	n.s.	n.s.	n.s.	n.s.
Acridine	ug/L	<0.05	<0.05	<0.05	0.5	n.s.	n.s.	n.s.
Anthracene	ug/L	<0.1	<0.1	<0.1	1	n.s.	n.s.	1,000
Benzo(a)anthracene	ug/L	<0.01	<0.01	<0.01	1	n.s.	n.s.	0.07
Benzo(a)pyrene	ug/L	<0.01	<0.01	<0.01	0.1	n.s.	n.s.	0.01
Benzo(b+j)fluoranthene	ug/L	<0.02	<0.02	<0.02	n.s.	n.s.	n.s.	n.s.
Benzo(g,h,i)perylene	ug/L	<0.1	<0.1	<0.1	n.s.	n.s.	n.s.	n.s.
Benzo(k)fluoranthene	ug/L	<0.02	<0.02	<0.02	n.s.	n.s.	n.s.	n.s.
Chrysene	ug/L	<0.1	<0.1	<0.1	1	n.s.	n.s.	7
Dibenz(a,h)anthracene	ug/L	<0.01	<0.01	<0.01	n.s.	n.s.	n.s.	0.01
Fluoranthene	ug/L	<0.1	<0.1	<0.1	2	n.s.	n.s.	150
Fluorene	ug/L	<0.1	<0.1	<0.1	120	n.s.	n.s.	150
Indeno(1,2,3-c,d)pyrene	ug/L	<0.1	<0.1	<0.1	n.s.	n.s.	n.s.	n.s.
Naphthalene	ug/L	<0.1	<0.1	<0.1	10	n.s.	n.s.	80
Phenanthrene	ug/L	<0.1	<0.1	<0.1	3	n.s.	n.s.	n.s.
Pyrene	ug/L	<0.02	<0.02	<0.02	0.2	n.s.	n.s.	100
Quinoline	ug/L	<0.01	<0.01	<0.01	34	n.s.	n.s.	0.05

Notes:

1 - Data excerpted from Exova analytical reports; units as indicated

2 - BC Contaminated Sites Regulation (CSR) Schedule 3.2 Generic Numerical Water Standards, site-specific pathways as noted above

n.s. = No applicable standard

< = Less than the laboratory method detection limit

Bold, underlined, and shaded grey indicates concentration exceeds lowest of the applicable standards

Table 6. Summary of Surface Water Analytical Results - Metals

Sample ID		SS18-01	SS18-02	SS18-02A	SS18-03	CSR Schedule 3.2 ²			
Matrix		Surface Water	Surface Water	Surface Water	Surface Water				
Sample Date		26-Sep-18	26-Sep-18	26-Sep-18	26-Sep-18	Freshwater Aquatic Life	Irrigation	Livestock	Drinking Water
Comments		Pond	Pond	Pond	Pond				
PARAMETERS	Units	Analytical Results ¹							
Hardness as CaCO ₃	mg/L	110	116	118	109	n.s.	n.s.	n.s.	n.s.
Total Metals									
Aluminum	ug/L	27	32	230	28	n.s.	5,000	5,000	9,500
Antimony	ug/L	0.19	0.20	0.22	0.19	90	n.s.	n.s.	6
Arsenic	ug/L	0.8	0.8	1.0	0.8	50	100	25	10
Barium	ug/L	34	37	38	34	10,000	n.s.	n.s.	1,000
Beryllium	ug/L	<0.05	<0.05	<0.05	<0.05	1.5	100	100	8
Bismuth	ug/L	<0.1	<0.1	<0.1	<0.1	n.s.	n.s.	n.s.	n.s.
Boron	ug/L	44	45	47	40	12,000	500 to 6,000 ³	5,000	5,000
Cadmium	ug/L	<0.01	<0.01	<0.01	<0.01	0.5 to 4 ^H	5	80	5
Chromium	ug/L	<0.05	<0.05	0.46	<0.05	10 (CrIV)/90 (CrIII)	8 (CrIV)/5 (CrIII)	50 (CrIV)/50 (CrIII)	50 (CrIV)/6,000 (CrIII)
Cobalt	ug/L	<u>1.7</u>	<u>1.9</u>	<u>2.0</u>	<u>1.7</u>	40	50	1,000	1
Copper	ug/L	0.6	0.6	1.2	0.7	20 to 90 ^H	200	300	1,500
Iron	ug/L	2000	2200	2500	2300	n.s.	5,000	n.s.	6,500
Lead	ug/L	0.03	0.02	0.07	0.03	40 to 160 ^H	200	100	10
Lithium	ug/L	<0.5	<0.5	<0.5	<0.5	n.s.	2,500	5,000	8
Manganese	ug/L	2700	3100	3100	2700	n.s.	200	n.s.	1,500
Molybdenum	ug/L	0.03	0.02	0.04	0.02	10,000	10 to 30 ⁴	50	250
Nickel	ug/L	0.8	0.8	1.1	0.7	250 to 1,500 ^H	200	1,000	80
Selenium	ug/L	<0.2	<0.2	<0.2	<0.2	20	20 ⁵ or 50 ⁶	30	10
Silver	ug/L	<0.01	<0.01	<0.01	<0.01	0.5 to 15 ^H	n.s.	n.s.	20
Strontium	ug/L	66	70	71	64	n.s.	n.s.	n.s.	2,500
Tellurium	ug/L	<0.05	<0.05	<0.05	<0.05	n.s.	n.s.	n.s.	n.s.
Thallium	ug/L	<0.01	<0.01	<0.01	<0.01	3	n.s.	n.s.	n.s.
Thorium	ug/L	<0.05	<0.05	<0.05	<0.05	n.s.	n.s.	n.s.	n.s.
Tin	ug/L	<0.1	<0.1	<0.1	<0.1	n.s.	n.s.	n.s.	2,500
Titanium	ug/L	1.9	1.7	18	1.7	1,000	n.s.	n.s.	n.s.
Uranium	ug/L	<0.01	<0.01	<0.01	<0.01	85	10	200	20
Vanadium	ug/L	0.17	0.12	1.0	0.1	n.s.	100	100	20
Zinc	ug/L	5.0	5.1	5.4	5.1	75 to 2,400 ^H	1,000 to 5,000 ^H	2,000	3,000
Zirconium	ug/L	<0.1	<0.1	0.1	<0.1	n.s.	n.s.	n.s.	n.s.

Notes:
1 - Data excerpted from Exova analytical reports; units as indicated
2 - BC Contaminated Sites Regulation (CSR) Schedule 3.2 Generic Numerical Water Standards, site-specific pathways as noted above
3 - The standard for boron is crop specific with the lowest of the range noted above
4 - The standard for molybdenum varies with site-specific factors. The lowest of the range is noted above.
5 - The standard for selenium is for continuous applications on crops
6 - The standard for selenium is for intermittent application on crops
n.s. = No applicable standard
H = Standard is hardness dependant and is specific to each sample with the range noted above
- = Parameter not analyzed
< = Less than the laboratory method detection limit
Bold, underlined, and shaded grey indicates concentration exceeds lowest of the applicable standards

Table 7. Summary of Surface Water Analytical Results – Routine Parameters

Sample ID		SS18-01	SS18-02	SS18-02A	SS18-03	CSR Schedule 3.2 ²			
Matrix		Surface Water	Surface Water	Surface Water	Surface Water				
Sample Date		43369	43369	43369	43,369.00	Freshwater Aquatic Life	Irrigation	Livestock	Drinking Water
Comments		Pond	Pond	Pond	Pond				
PARAMETERS	Units	Analytical Results ¹							
Routine Parameters									
Calcium	mg/L	37	39	40	36	n.s.	n.s.	1,000	n.s.
Magnesium	mg/L	4.3	4.5	4.6	4.3	n.s.	n.s.	n.s.	n.s.
Potassium	mg/L	1.0	1.1	1.1	1	n.s.	n.s.	n.s.	n.s.
Silicon	mg/L	5.6	6.0	6.2	5.6	n.s.	n.s.	n.s.	n.s.
Sodium	mg/L	2.1	2.2	2.1	2	n.s.	n.s.	n.s.	200
Sulphur	mg/L	1.80	1.90	1.9	1.7	n.s.	n.s.	n.s.	n.s.
Hardness as CaCO ₃	mg/L	110	116	118	109	n.s.	n.s.	n.s.	n.s.

Notes:
1 - Data excerpted from Exova analytical reports; units as indicated
2 - BC Contaminated Sites Regulation (CSR) Schedule 3.2 Generic Numerical Water Standards, site-specific pathways as noted above
n.s. = No applicable standard
* = Standard has been converted to mg/L to correspond with laboratory results
< = Less than the laboratory method detection limit
Bold, underlined, and shaded grey indicates concentration exceeds lowest of the applicable standards

Table 8. Relative Percent Difference of Field Duplicate Samples

Sample ID	SS18-02	SS18-02A	Relative Percent Difference (RPD) ¹
Matrix	Surface Water	Surface Water	
Sample Date	26-Sep-18	26-Sep-18	
PARAMETERS	Analytical Results		
Hardness as CaCO ₃	116	118	1.71
Aluminum	32	230	151.15
Antimony	0.2	0.22	9.52
Arsenic	0.8	1	22.22
Barium	37	38	2.67
Beryllium	<0.05	<0.05	*
Bismuth	<0.1	<0.1	*
Boron	45	47	4.35
Cadmium	<0.01	<0.01	*
Chromium	<0.05	0.46	*
Cobalt	1.9	2.0	5.13
Copper	0.6	1.2	*
Iron	2200	2500	12.77
Lead	0.02	0.07	*
Lithium	<0.5	<0.5	*
Manganese	3100	3100	0.00
Molybdenum	0.02	0.04	*
Nickel	0.8	1.1	*
Selenium	<0.2	<0.2	*
Silver	<0.01	<0.01	*
Strontium	70	71	1.42
Tellurium	<0.05	<0.05	*
Thallium	<0.01	<0.01	*
Thorium	<0.05	<0.05	*
Tin	<0.1	<0.1	*
Titanium	1.7	18	165.48
Uranium	<0.01	<0.01	*
Vanadium	0.12	1	*
Zinc	5.1	5.4	5.71
Zirconium	<0.1	0.1	*

Notes:

1 - RPD values below 20% are generally considered acceptable sampling and analytical precision as per the BC Field Sampling Manual

* RPD not calculated as both values did not exceed 5 times the laboratory method detection limit, or the parameter did not have a method detection limit listed

Bold, underlined, and shaded indicates concentration exceeds lowest of the applicable standards

Report Transmission Cover Page

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Proj. Acct. code:	

Contact	Company	Address
Accounts Payable	TerraWest Environmental Inc.	206, 2800 Bryn Maur Road Victoria, BC V9B 3T4 Phone: (866) 500-1553 Fax: (250) 389-1554 Email: ap@terrawest.ca

Delivery	Format	Deliverables
Email - Single Report	PDF	Invoice

Derek Nickel	TerraWest Environmental Inc.	3148 F Barons Road Nanaimo, BC V9T 4B5 Phone: (866) 500-1553 Fax: Email: dnickel@terrawest.ca
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Delivery	Format	Deliverables
Email - Merge Reports	PDF	COC / Test Report
Email - Single Report	PDF	COA
Email - Single Report	Standard Crosstab	Test Report

Erich Bell	TerraWest Environmental Inc.	3148 Unit G Barons Road Nanaimo, BC V9T 4B5 Phone: (866) 500-1553 Fax: Email: ebell@terrawest.ca
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Delivery	Format	Deliverables
Email - Multiple Reports By Lot	PDF	COC / Test Report
Email - Multiple Reports By Lot	PDF	COR
Email - Multiple Reports By Lot	Standard Crosstab	Test Report
Email - Single Report	PDF	COC / COA

Notes To Clients:

- Sep 28, 2018 - Reduction of analytical volume was necessary for metals analysis to bring results within the analytical range for samples. Detection limits are adjusted accordingly.
- Oct 22, 2018 - Dioxin and furan analysis was performed by a subcontract laboratory. See attached 7 page report PR182812.

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Analytical Report

Bill To: TerraWest Environmental Inc.	Project ID: 2018447.01	Lot ID: 1300986
206, 2800 Bryn Maur Road	Project Name: DCMM18-01	Control Number:
Victoria, BC, Canada	Project Location: Port Alberni	Date Received: Sep 27, 2018
V9B 3T4	LSD:	Date Reported: Oct 22, 2018
Attn: Accounts Payable	P.O.:	Report Number: 2327037
Sampled By: Derek Nickel	Proj. Acct. code:	
Company: TerraWest		

		Reference Number	1300986-1	1300986-2	1300986-3	
		Sample Date	Sep 26, 2018	Sep 26, 2018	Sep 26, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	SS18-01	SS18-02	SS18-03	
		Matrix	Soil	Soil	Soil	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Strong Acid Digestion						
Prep			Dried, sieve -325	Dried, sieve -325	Dried, sieve -325	
Aluminum	Strong Acid Extractable	µg/g	25000	27000	27000	0.5
Antimony	Strong Acid Extractable	µg/g	5.1	5.6	5.7	1.5
Arsenic	Strong Acid Extractable	µg/g	19	12	11	0.35
Barium	Strong Acid Extractable	µg/g	110	130	160	0.2
Beryllium	Strong Acid Extractable	µg/g	0.40	0.44	0.47	0.01
Cadmium	Strong Acid Extractable	µg/g	0.55	0.3	0.3	0.05
Calcium	Strong Acid Extractable	µg/g	7300	11000	9700	0.5
Chromium	Strong Acid Extractable	µg/g	90	90	96	0.1
Cobalt	Strong Acid Extractable	µg/g	24	27	29	0.1
Copper	Strong Acid Extractable	µg/g	94	99	96	0.1
Iron	Strong Acid Extractable	µg/g	44000	42000	44000	0.02
Lead	Strong Acid Extractable	µg/g	15	8.4	4	0.5
Lithium	Strong Acid Extractable	µg/g	13	14	16	0.15
Magnesium	Strong Acid Extractable	µg/g	6900	8000	8300	1
Manganese	Strong Acid Extractable	µg/g	420	660	460	0.05
Mercury	Strong Acid Extractable	µg/g	0.81	0.34	0.33	0.003
Molybdenum	Strong Acid Extractable	µg/g	0.4	<0.10	<0.10	0.1
Nickel	Strong Acid Extractable	µg/g	42	42	45	0.25
Phosphorus	Strong Acid Extractable	µg/g	1400	580	510	0.5
Potassium	Strong Acid Extractable	µg/g	680	760	760	2
Selenium	Strong Acid Extractable	µg/g	2	0.6	1	0.5
Silicon	Strong Acid Extractable	µg/g	570	430	390	0.25
Silver	Strong Acid Extractable	µg/g	1.5	0.81	0.5	0.4
Sodium	Strong Acid Extractable	µg/g	140	170	150	5
Strontium	Strong Acid Extractable	µg/g	19	23	25	0.05
Thallium	Strong Acid Extractable	µg/g	<0.5	<0.5	<0.5	0.5
Tin	Strong Acid Extractable	µg/g	2	1	0.8	0.5
Titanium	Strong Acid Extractable	µg/g	1000	1300	1100	0.1
Vanadium	Strong Acid Extractable	µg/g	150	150	160	0.2
Zinc	Strong Acid Extractable	µg/g	280	130	97	0.05
Zirconium	Strong Acid Extractable	µg/g	5.8	6.2	5.5	0.1
Prep	Sieve 230 mesh		Done	Done	Done	
Soil Acidity						
pH	1:2 Soil:Water	pH	5.1	5.7	6.0	0.5
Mono-Aromatic Hydrocarbons - Soil						
Benzene	Dry Weight	µg/g	<0.02	<0.02	<0.02	0.02
Toluene	Dry Weight	µg/g	<0.05	<0.05	<0.05	0.05
Ethylbenzene	Dry Weight	µg/g	<0.05	<0.05	<0.05	0.05

Analytical Report

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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		Reference Number	1300986-1	1300986-2	1300986-3	
		Sample Date	Sep 26, 2018	Sep 26, 2018	Sep 26, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	SS18-01	SS18-02	SS18-03	
		Matrix	Soil	Soil	Soil	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Soil - Continued						
Total Xylenes (m,p,o)	Dry Weight	µg/g	<0.05	<0.05	<0.05	0.05
Styrene	Dry Weight	µg/g	<0.05	<0.05	<0.05	0.05
Methyl t-Butyl Ether	Dry Weight	µg/g	<0.05	<0.05	<0.05	0.05
Toluene-d8	Surrogate	%	100.68	114.82	101.10	80-120
Dibromofluoromethane	Surrogate	%	107.56	102.86	110.44	80-120
4-Bromofluorobenzene	Surrogate	%	105.84	109.52	101.70	80-120
Methanol Field Preservation			Yes	Yes	Yes	
Volatile Petroleum Hydrocarbons - Soil						
VHs6-10	Dry Weight	µg/g	<50	<50	<50	50
VPHs (VHs6-10 minus BTEX)	Dry Weight	µg/g	<50	<50	<50	50
Field Preservation						
Methanol Field Preservation			Yes	Yes	Yes	
Extractable Petroleum Hydrocarbons - Soil						
EPHs10-19	Dry Weight	µg/g	51	25	<20	20
EPHs19-32	Dry Weight	µg/g	1380	348	156	20
LEPHs	Dry Weight	µg/g	49	25	<20	20
HEPHs	Dry Weight	µg/g	1380	348	156	20
2-Methylnonane	Surrogate	%	86	96	88	60-140
Soil % Moisture						
Moisture	Soil % Moisture	%	85.2	80.50	78.6	0.1
Polycyclic Aromatic Hydrocarbons - Soil						
2-Methylnaphthalene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Acenaphthene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Acenaphthylene	Dry Weight	µg/g	0.22	<0.03	<0.03	0.03
Anthracene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Benzo(a)anthracene	Dry Weight	µg/g	<0.03	0.08	0.06	0.03
Benzo(a)pyrene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Benzo(b+j)fluoranthene	Dry Weight	µg/g	<0.06	<0.06	<0.06	0.06
Benzo(g,h,i)perylene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Benzo(k)fluoranthene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Chrysene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Dibenzo(a,h)anthracene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Fluoranthene	Dry Weight	µg/g	0.30	0.07	0.07	0.03
Fluorene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Indeno(1,2,3-c,d)pyrene	Dry Weight	µg/g	<0.03	<0.03	<0.03	0.03
Naphthalene	Dry Weight	µg/g	0.63	<0.03	<0.03	0.03
Phenanthrene	Dry Weight	µg/g	0.44	0.10	0.06	0.03
Pyrene	Dry Weight	µg/g	0.28	<0.03	<0.03	0.03

Analytical Report

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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		Reference Number	1300986-1	1300986-2	1300986-3	
		Sample Date	Sep 26, 2018	Sep 26, 2018	Sep 26, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	SS18-01	SS18-02	SS18-03	
		Matrix	Soil	Soil	Soil	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
PAH - Soil - Surrogate Recovery						
2-Fluorobiphenyl	PAH - Surrogate	%	113.89	106.80	99.34	50-130
Naphthalene-d8	PAH - Surrogate	%	95.81	94.76	94.17	50-130
p-Terphenyl-d14	PAH - Surrogate	%	99.26	107.12	109.66	60-130
Quinoline-d7	PAH - Surrogate	%	84.98	89.76	94.41	50-130
Chlorinated Phenols - Soil						
Monochlorophenols	Dry Weight	mg/kg	<0.05	<0.05	<0.05	0.05
Dichlorophenols	Dry Weight	mg/kg	<0.05	<0.05	<0.05	0.05
Trichlorophenols	Dry Weight	mg/kg	<0.05	<0.05	<0.05	0.05
Tetrachlorophenols	Dry Weight	mg/kg	<0.05	<0.05	<0.05	0.05
Pentachlorophenol	Dry Weight	mg/kg	<0.02	<0.02	<0.02	0.02
Total Chlorophenols	Dry Weight	mg/kg	<0.05	<0.05	<0.05	0.05
Chlorinated Phenols - Soil - Surrogate Recovery						
2,4,6-Tribromophenol	PCP - Surrogate	%	44	49	48	50-140

Analytical Report

Bill To: TerraWest Environmental Inc.	Project ID: 2018447.01	Lot ID: 1300986
206, 2800 Bryn Maur Road	Project Name: DCMM18-01	Control Number:
Victoria, BC, Canada	Project Location: Port Alberni	Date Received: Sep 27, 2018
V9B 3T4	LSD:	Date Reported: Oct 22, 2018
Attn: Accounts Payable	P.O.:	Report Number: 2327037
Sampled By: Derek Nickel	Proj. Acct. code:	
Company: TerraWest		

		Reference Number	1300986-4	1300986-5	1300986-6	
		Sample Date	Sep 26, 2018	Sep 26, 2018	Sep 26, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	SW18-01	SW18-02	SW18-02A	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Routine Water						
Hardness	Total	mg CaCO3/L	110	116	118	1
Trace Metals Total						
Aluminum	Total	µg/L	27	32	230	1
Antimony	Total	µg/L	0.19	0.20	0.22	0.02
Arsenic	Total	µg/L	0.8	0.8	1.0	0.1
Barium	Total	µg/L	34	37	38	0.1
Beryllium	Total	µg/L	<0.05	<0.05	<0.05	0.05
Bismuth	Total	µg/L	<0.1	<0.1	<0.1	0.1
Boron	Total	µg/L	44	45	47	2
Cadmium	Total	µg/L	<0.01	<0.01	<0.01	0.01
Chromium	Total	µg/L	<0.05	<0.05	0.46	0.05
Cobalt	Total	µg/L	1.7	1.9	2.0	0.02
Copper	Total	µg/L	0.6	0.6	1.2	0.2
Iron	Total	µg/L	2000	2200	2500	2
Lead	Total	µg/L	0.03	0.02	0.07	0.01
Lithium	Total	µg/L	<0.5	<0.5	<0.5	0.5
Manganese	Total	µg/L	2700	3100	3100	1
Molybdenum	Total	µg/L	0.03	0.02	0.04	0.02
Nickel	Total	µg/L	0.8	0.8	1.1	0.2
Selenium	Total	µg/L	<0.2	<0.2	<0.2	0.2
Silver	Total	µg/L	<0.01	<0.01	<0.01	0.01
Strontium	Total	µg/L	66	70	71	0.1
Tellurium	Total	µg/L	<0.05	<0.05	<0.05	0.05
Thallium	Total	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Total	µg/L	<0.05	<0.05	<0.05	0.05
Tin	Total	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Total	µg/L	1.9	1.7	18	0.1
Uranium	Total	µg/L	<0.01	<0.01	<0.01	0.01
Vanadium	Total	µg/L	0.17	0.12	1.0	0.05
Zinc	Total	µg/L	5.0	5.1	5.4	0.5
Zirconium	Total	µg/L	<0.1	<0.1	0.1	0.1
Calcium	Total	µg/L	37000	39000	40000	10
Magnesium	Total	µg/L	4300	4500	4600	20
Potassium	Total	µg/L	1000	1100	1100	40
Silicon	Total	µg/L	5600	6000	6200	5
Sodium	Total	µg/L	2100	2200	2100	100
Sulfur	Total	µg/L	1800	1900	1900	20

Analytical Report

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest		

		Reference Number	1300986-4	1300986-5	1300986-7	
		Sample Date	Sep 26, 2018	Sep 26, 2018	Sep 26, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	SW18-01	SW18-02	SW18-03	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Mono-Aromatic Hydrocarbons - Water						
Benzene		µg/L	<0.5	<0.5	<0.5	0.5
Ethylbenzene		µg/L	<0.5	<0.5	<0.5	0.5
Methyl t-Butyl Ether		µg/L	<0.5	<0.5	<0.5	0.5
Styrene		µg/L	<0.5	<0.5	<0.5	0.5
Toluene		µg/L	<0.5	<0.5	<0.5	0.5
Total Xylenes (m,p,o)		µg/L	<0.5	<0.5	<0.5	0.5
Dibromofluoromethane	Surrogate	%	97.24	105.90	92.86	80-120
Toluene-d8	Surrogate	%	109.50	116.52	111.00	80-120
4-Bromofluorobenzene	Surrogate	%	112.04	116.90	106.02	80-120
Volatile Petroleum Hydrocarbons - Water						
VPHw (VHw6-10 minus BTEX)		µg/L	<50	<50	<50	50
VHw6-10		µg/L	<50	<50	<50	50
Extractable Petroleum Hydrocarbons - Water						
2-Methylnonane	Surrogate	%	130	110	120	60-140
EPHw10-19		µg/L	<200	<200	<200	200
EPHw19-32		µg/L	<200	<200	<200	200
LEPHw		µg/L	<200	<200	<200	200
HEPHw		µg/L	<200	<200	<200	200
Polycyclic Aromatic Hydrocarbons - Water						
Acenaphthene		µg/L	<0.1	<0.1	<0.1	0.1
Acenaphthylene		µg/L	<0.1	<0.1	<0.1	0.1
Acridine		µg/L	<0.05	<0.05	<0.05	0.05
Anthracene		µg/L	<0.1	<0.1	<0.1	0.1
Benzo(a)anthracene		µg/L	<0.01	<0.01	<0.01	0.01
Benzo(a)pyrene		µg/L	<0.01	<0.01	<0.01	0.01
Benzo(b+j)fluoranthene		µg/L	<0.02	<0.02	<0.02	0.02
Benzo(g,h,i)perylene		µg/L	<0.1	<0.1	<0.1	0.1
Benzo(k)fluoranthene		µg/L	<0.02	<0.02	<0.02	0.02
Chrysene		µg/L	<0.1	<0.1	<0.1	0.1
Dibenzo(a,h)anthracene		µg/L	<0.01	<0.01	<0.01	0.01
Fluoranthene		µg/L	<0.1	<0.1	<0.1	0.1
Fluorene		µg/L	<0.1	<0.1	<0.1	0.1
Indeno(1,2,3-c,d)pyrene		µg/L	<0.1	<0.1	<0.1	0.1
Naphthalene		µg/L	<0.1	<0.1	<0.1	0.1
Phenanthrene		µg/L	<0.1	<0.1	<0.1	0.1
Pyrene		µg/L	<0.02	<0.02	<0.02	0.02
Quinoline		µg/L	<0.01	<0.01	<0.01	0.01

Analytical Report

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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		Reference Number	1300986-4	1300986-5	1300986-7	
		Sample Date	Sep 26, 2018	Sep 26, 2018	Sep 26, 2018	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	SW18-01	SW18-02	SW18-03	
		Matrix	Water	Water	Water	
Analyte		Units	Results	Results	Results	Nominal Detection Limit
PAH - Water - Surrogate Recovery						
2-Fluorobiphenyl	PAH - Surrogate	%	74.55	66.43	60.85	50-130
p-Terphenyl-d14	PAH - Surrogate	%	92.81	67.35	65.99	60-130
Naphthalene-d8	PAH - Surrogate	%	90.45	88.80	84.46	50-130
Quinoline-d7	PAH - Surrogate	%	88.54	69.80	66.71	50-130

Analytical Report

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest		

		Reference Number	1300986-7			
		Sample Date	Sep 26, 2018			
		Sample Time	NA			
		Sample Location				
		Sample Description	SW18-03			
		Matrix	Water			
Analyte		Units	Results	Results	Results	Nominal Detection Limit
Routine Water						
Hardness	Total	mg CaCO3/L	109			1
Trace Metals Total						
Aluminum	Total	µg/L	28			1
Antimony	Total	µg/L	0.19			0.02
Arsenic	Total	µg/L	0.8			0.1
Barium	Total	µg/L	34			0.1
Beryllium	Total	µg/L	<0.05			0.05
Bismuth	Total	µg/L	<0.1			0.1
Boron	Total	µg/L	40			2
Cadmium	Total	µg/L	<0.01			0.01
Chromium	Total	µg/L	<0.05			0.05
Cobalt	Total	µg/L	1.7			0.02
Copper	Total	µg/L	0.7			0.2
Iron	Total	µg/L	2300			2
Lead	Total	µg/L	0.03			0.01
Lithium	Total	µg/L	<0.5			0.5
Manganese	Total	µg/L	2700			1
Molybdenum	Total	µg/L	0.02			0.02
Nickel	Total	µg/L	0.7			0.2
Selenium	Total	µg/L	<0.2			0.2
Silver	Total	µg/L	<0.01			0.01
Strontium	Total	µg/L	64			0.1
Tellurium	Total	µg/L	<0.05			0.05
Thallium	Total	µg/L	<0.01			0.01
Thorium	Total	µg/L	<0.05			0.05
Tin	Total	µg/L	<0.1			0.1
Titanium	Total	µg/L	1.7			0.1
Uranium	Total	µg/L	<0.01			0.01
Vanadium	Total	µg/L	0.10			0.05
Zinc	Total	µg/L	5.1			0.5
Zirconium	Total	µg/L	<0.1			0.1
Calcium	Total	µg/L	36000			10
Magnesium	Total	µg/L	4300			20
Potassium	Total	µg/L	1000			40
Silicon	Total	µg/L	5600			5
Sodium	Total	µg/L	2000			100
Sulfur	Total	µg/L	1700			20

Analytical Report

Bill To:	TerraWest Environmental Inc.	Project ID:	2018447.01	Lot ID:	1300986
	206, 2800 Bryn Maur Road	Project Name:	DCMM18-01	Control Number:	
	Victoria, BC, Canada	Project Location:	Port Alberni	Date Received:	Sep 27, 2018
	V9B 3T4	LSD:		Date Reported:	Oct 22, 2018
Attn:	Accounts Payable	P.O.:		Report Number:	2327037
Sampled By:	Derek Nickel	Proj. Acct. code:			
Company:	TerraWest				

Approved by: 

Mathieu Simoneau
Operations Manager

Data have been validated by Analytical Quality Control and Exova's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process.

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
Sampled By: Derek Nickel Company: TerraWest		

Chlorinated Phenols - Soil

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
2-Chlorophenol	ng/mL	0	-0.08	0.08	yes
3-Chlorophenol	ng/mL	0	-0.08	0.08	yes
4-Chlorophenol	ng/mL	0	-0.08	0.08	yes
4-Chloro-3-methylphenol	ng/mL	0	-0.08	0.08	yes
2,6-Dichlorophenol	ng/mL	0	-0.08	0.08	yes
2,3-Dichlorophenol	ng/mL	0	-0.08	0.08	yes
2,4 & 2,5-Dichlorophenol	ng/mL	0	-0.08	0.08	yes
3,4-Dichlorophenol	ng/mL	0	-0.08	0.08	yes
3,5-Dichlorophenol	ng/mL	0	-0.08	0.08	yes
2,3,4-Trichlorophenol	ng/mL	0	-0.08	0.08	yes
2,3,5-Trichlorophenol	ng/mL	0	-0.08	0.08	yes
2,3,6-Trichlorophenol	ng/mL	0	-0.08	0.08	yes
2,4,5-Trichlorophenol	ng/mL	0	-0.08	0.08	yes
2,4,6-Trichlorophenol	ng	0	-0.08	0.08	yes
3,4,5-Trichlorophenol	ng/mL	0	-0.08	0.08	yes
2,3,4,5-Tetrachlorophenol	ng/mL	0	-0.08	0.08	yes
2,3,4,6-Tetrachlorophenol	ng/mL	0	-0.08	0.08	yes
2,3,5,6-Tetrachlorophenol	ng/mL	0	-0.08	0.08	yes
Monochlorophenols	ng/mL	0	-0.08	0.08	yes
Dichlorophenols	ng/mL	0	-0.08	0.08	yes
Trichlorophenols	ng/mL	0	-0.08	0.08	yes
Tetrachlorophenols	ng/mL	0	-0.08	0.08	yes
Pentachlorophenol	ng/mL	0	-0.08	0.08	yes

Date Acquired: September 28, 2018

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
2-Chlorophenol	ng/mL	95.70	80	120	yes
3-Chlorophenol	ng/mL	85.27	80	120	yes
4-Chlorophenol	ng/mL	96.03	80	120	yes
4-Chloro-3-methylphenol	ng/mL	85.60	80	120	yes
2,6-Dichlorophenol	ng/mL	95.10	80	120	yes
2,3-Dichlorophenol	ng/mL	92.77	80	120	yes
2,4 & 2,5-Dichlorophenol	ng/mL	94.73	80	120	yes
3,4-Dichlorophenol	ng/mL	80.31	80	120	yes
3,5-Dichlorophenol	ng/mL	93.09	80	120	yes
2,3,4-Trichlorophenol	ng/mL	86.20	80	120	yes
2,3,5-Trichlorophenol	ng/mL	95.30	80	120	yes
2,3,6-Trichlorophenol	ng/mL	99.50	80	120	yes
2,4,5-Trichlorophenol	ng/mL	82.90	80	120	yes
2,4,6-Trichlorophenol	ng	95.10	80	120	yes
3,4,5-Trichlorophenol	ng/mL	82.60	80	120	yes
2,3,4,5-Tetrachlorophenol	ng/mL	90.20	80	120	yes
2,3,4,6-Tetrachlorophenol	ng/mL	95.90	80	120	yes
2,3,5,6-Tetrachlorophenol	ng/mL	93.30	80	120	yes
Pentachlorophenol	ng/mL	95.40	80	120	yes

Date Acquired: September 28, 2018

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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Chlorinated Phenols - Soil - Continued

Chlorinated Phenols - Soil - Surrogate

Recovery

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
2,4,6-Tribromophenol	%	107.844	50	140	yes
Date Acquired: September 28, 2018					

Extractable Petroleum Hydrocarbons - Soil

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
EPHs10-19	µg/mL	0	-20	20	yes
EPHs19-32	µg/mL	2.90397	-20	20	yes
Date Acquired: September 26, 2018					

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
EPHs10-19	µg/mL	102.04	85	115	yes
EPHs19-32	µg/mL	100.64	85	115	yes
Date Acquired: September 26, 2018					

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
EPHs10-19	µg/g	2470	2576	1803	3348	yes
EPHs19-32	µg/g	3470	3743	2620	4866	yes
Date Acquired: September 26, 2018						

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
EPHs10-19	µg/g	<20	<20	40	100	yes
EPHs19-32	µg/g	<20	<20	40	100	yes
Date Acquired: September 26, 2018						

Extractable Petroleum Hydrocarbons - Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
EPHw10-19	µg/mL	0.86	-5.010	5.010	yes
EPHw19-32	µg/mL	0	-5.010	5.010	yes
Date Acquired: September 28, 2018					

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
C20	µg/mL	93.82	85	115	yes
Date Acquired: September 28, 2018					
EPHw10-19	µg/mL	103.84	70	130	yes
EPHw19-32	µg/mL	102.17	70	130	yes
Date Acquired: September 28, 2018					

Metals Strong Acid Digestion

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	mg/L	0	-0.010	0.010	yes
Antimony	mg/L	0.000863457	-0.030	0.030	yes
Arsenic	mg/L	0.00665642	-0.007	0.007	yes
Barium	mg/L	0.000228096	-0.004	0.004	yes

Quality Control

Bill To: TerraWest Environmental Inc.	Project ID: 2018447.01	Lot ID: 1300986
206, 2800 Bryn Maur Road	Project Name: DCMM18-01	Control Number:
Victoria, BC, Canada	Project Location: Port Alberni	Date Received: Sep 27, 2018
V9B 3T4	LSD:	Date Reported: Oct 22, 2018
Attn: Accounts Payable	P.O.:	Report Number: 2327037
Sampled By: Derek Nickel	Proj. Acct. code:	
Company: TerraWest		

Metals Strong Acid Digestion - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Beryllium	mg/L	0.000144222	-0.000	0.000	yes
Cadmium	mg/L	6.98787e-005	-0.001	0.001	yes
Calcium	mg/L	0	-0.010	0.010	yes
Chromium	mg/L	0.000679504	-0.002	0.002	yes
Cobalt	mg/L	-0.000378373	-0.002	0.002	yes
Copper	mg/L	-0.00142536	-0.002	0.002	yes
Iron	mg/L	0	-0.004	0.004	yes
Lead	mg/L	0.00276329	-0.010	0.010	yes
Lithium	mg/L	0.00234696	-0.003	0.003	yes
Magnesium	mg/L	0.0191327	-0.020	0.020	yes
Manganese	mg/L	0	-0.001	0.001	yes
Mercury	µg/L	-0.019	-0.030	0.030	yes
Molybdenum	mg/L	-0.00054053	-0.002	0.002	yes
Nickel	mg/L	-0.000928137	-0.005	0.005	yes
Phosphorus	mg/L	0	-0.010	0.010	yes
Potassium	mg/L	0	-0.039	0.039	yes
Selenium	mg/L	0.00829735	-0.010	0.010	yes
Silver	mg/L	0	-0.008	0.008	yes
Sodium	mg/L	0.0692587	-0.099	0.099	yes
Strontium	mg/L	-8.3387e-005	-0.000	0.000	yes
Thallium	mg/L	-0.00512229	-0.010	0.010	yes
Tin	mg/L	-0.00180173	-0.010	0.010	yes
Titanium	mg/L	5.34582e-005	-0.002	0.002	yes
Vanadium	mg/L	0.000430753	-0.004	0.004	yes
Zinc	mg/L	0	-0.001	0.001	yes
Zirconium	mg/L	0.000365435	-0.002	0.002	yes

Date Acquired: October 01, 2018

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Aluminum	mg/L	93.88	90	110	yes
Antimony	mg/L	94.78	90	110	yes
Arsenic	mg/L	96.64	90	110	yes
Barium	mg/L	98.26	90	110	yes
Beryllium	mg/L	98.55	90	110	yes
Cadmium	mg/L	97.13	90	110	yes
Calcium	mg/L	98.10	90	110	yes
Chromium	mg/L	97.96	90	110	yes
Cobalt	mg/L	103.95	90	110	yes
Copper	mg/L	97.93	90	110	yes
Iron	mg/L	98.10	90	110	yes
Lead	mg/L	99.74	90	110	yes
Lithium	mg/L	94.19	90	110	yes
Magnesium	mg/L	96.23	90	110	yes
Manganese	mg/L	101.74	90	110	yes
Molybdenum	mg/L	95.80	90	110	yes
Nickel	mg/L	101.06	90	110	yes

Quality Control

Bill To: TerraWest Environmental Inc.	Project ID: 2018447.01	Lot ID: 1300986
206, 2800 Bryn Maur Road	Project Name: DCMM18-01	Control Number:
Victoria, BC, Canada	Project Location: Port Alberni	Date Received: Sep 27, 2018
V9B 3T4	LSD:	Date Reported: Oct 22, 2018
Attn: Accounts Payable	P.O.:	Report Number: 2327037
Sampled By: Derek Nickel	Proj. Acct. code:	
Company: TerraWest		

Metals Strong Acid Digestion - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Phosphorus	mg/L	97.00	90	110	yes
Potassium	mg/L	93.70	90	110	yes
Selenium	mg/L	96.52	90	110	yes
Silicon	mg/L	94.48	90	110	yes
Silver	mg/L	98.67	90	110	yes
Sodium	mg/L	96.47	90	110	yes
Thallium	mg/L	95.90	90	110	yes
Tin	mg/L	97.53	90	110	yes
Titanium	mg/L	97.43	90	110	yes
Vanadium	mg/L	97.92	90	110	yes
Zinc	mg/L	97.53	90	110	yes
Zirconium	mg/L	95.27	90	110	yes
Date Acquired: October 01, 2018					
Aluminum	mg/L	91.22	90	110	yes
Antimony	mg/L	104.45	90	110	yes
Arsenic	mg/L	95.17	90	110	yes
Barium	mg/L	97.55	90	110	yes
Beryllium	mg/L	97.49	90	110	yes
Cadmium	mg/L	97.93	90	110	yes
Calcium	mg/L	97.42	90	110	yes
Chromium	mg/L	98.27	90	110	yes
Cobalt	mg/L	104.16	90	110	yes
Copper	mg/L	107.42	90	110	yes
Iron	mg/L	102.97	90	110	yes
Lead	mg/L	107.40	90	110	yes
Lithium	mg/L	94.71	90	110	yes
Magnesium	mg/L	95.75	90	110	yes
Manganese	mg/L	101.48	90	110	yes
Mercury	µg/L	102.83	90	110	yes
Molybdenum	mg/L	97.51	90	110	yes
Nickel	mg/L	102.26	90	110	yes
Phosphorus	mg/L	92.86	90	110	yes
Potassium	mg/L	91.32	90	110	yes
Selenium	mg/L	95.70	90	110	yes
Silicon	mg/L	96.00	90	110	yes
Silver	mg/L	96.25	90	110	yes
Sodium	mg/L	101.17	90	110	yes
Strontium	mg/L	96.84	90	110	yes
Thallium	mg/L	94.59	90	110	yes
Tin	mg/L	96.66	90	110	yes
Titanium	mg/L	96.02	90	110	yes
Vanadium	mg/L	97.61	90	110	yes
Zinc	mg/L	95.31	90	110	yes
Zirconium	mg/L	92.00	90	110	yes
Date Acquired: October 01, 2018					

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Proj. Acct. code:	

Metals Strong Acid Digestion - Continued

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	µg/g	25000	24000	30	2.500	yes
Antimony	µg/g	5.1	5.9	30	3.000	yes
Arsenic	µg/g	19	19	30	1.750	yes
Barium	µg/g	110	110	30	1.000	yes
Beryllium	µg/g	0.40	0.39	30	0.050	yes
Cadmium	µg/g	0.55	0.53	30	0.250	yes
Calcium	µg/g	7300	7300	30	2.500	yes
Chromium	µg/g	90	88	30	0.500	yes
Cobalt	µg/g	24	24	30	0.500	yes
Copper	µg/g	94	93	30	0.500	yes
Iron	µg/g	44000	42000	30	0.100	yes
Lead	µg/g	15	16	30	2.500	yes
Lithium	µg/g	13	13	30	0.750	yes
Magnesium	µg/g	6900	6800	30	5.000	yes
Manganese	µg/g	420	410	30	2.500	yes
Mercury	µg/g	0.81	0.76	30	0.500	yes
Molybdenum	µg/g	0.4	0.4	30	0.500	yes
Nickel	µg/g	42	42	30	1.250	yes
Phosphorus	µg/g	1400	1400	30	2.500	yes
Potassium	µg/g	680	680	30	10.000	yes
Selenium	µg/g	2	1	30	2.500	yes
Silver	µg/g	1.5	2.6	30	2.000	yes
Sodium	µg/g	140	140	30	25.000	yes
Strontium	µg/g	19	19	30	0.250	yes
Thallium	µg/g	<0.5	<0.5	30	2.500	yes
Tin	µg/g	2	2	30	2.500	yes
Vanadium	µg/g	150	140	30	1.000	yes
Zinc	µg/g	280	280	30	0.250	yes
Zirconium	µg/g	5.8	5.9	30	0.500	yes

Date Acquired: October 01, 2018

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/g	11000	9373.000	15511.000	yes
Antimony	µg/g	<1	0.040	2.080	yes
Arsenic	µg/g	4.6	2.940	5.520	yes
Barium	µg/g	160	139.210	174.790	yes
Beryllium	µg/g	0.55	0.405	0.603	yes
Cadmium	µg/g	0.2	0.101	0.341	yes
Calcium	µg/g	15000	12998.000	18122.000	yes
Chromium	µg/g	27	11.360	37.040	yes
Cobalt	µg/g	8.3	4.970	8.870	yes
Copper	µg/g	16	12.330	17.430	yes
Iron	µg/g	15000	12770.000	20366.000	yes
Lead	µg/g	9.4	5.500	11.320	yes
Lithium	µg/g	12	8.700	16.500	yes
Magnesium	µg/g	3000	2480.000	3500.000	yes

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Proj. Acct. code:	

Metals Strong Acid Digestion - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Manganese	µg/g	390	266.500	425.500	yes
Mercury	µg/g	0.020	0.012	0.034	yes
Molybdenum	µg/g	0.57	0.252	0.828	yes
Nickel	µg/g	23	16.430	23.720	yes
Phosphorus	µg/g	620	489.000	693.000	yes
Potassium	µg/g	1600	1078.000	2056.000	yes
Silicon	µg/g	460	73.000	1255.000	yes
Sodium	µg/g	130	78.800	189.200	yes
Strontium	µg/g	73	59.580	83.220	yes
Tin	µg/g	0.5	0.104	0.938	yes
Titanium	µg/g	99	74.800	125.200	yes
Vanadium	µg/g	34	25.800	48.600	yes
Zinc	µg/g	62	46.370	66.830	yes
Zirconium	µg/g	4.9	4.196	5.324	yes

Date Acquired: October 01, 2018

Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	0.00137947	-0.010	0.010	yes
Magnesium	mg/L	0.0148862	-0.020	0.020	yes
Potassium	mg/L	0	-0.040	0.040	yes
Silicon	mg/L	0.00329579	-0.005	0.005	yes
Sodium	mg/L	0.00675433	-0.099	0.099	yes

Date Acquired: September 27, 2018

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	100.74	90	110	yes
Magnesium	mg/L	99.51	90	110	yes
Potassium	mg/L	98.15	90	110	yes
Silicon	mg/L	95.23	90	110	yes
Sodium	mg/L	99.94	90	110	yes

Date Acquired: September 27, 2018

Calcium	mg/L	105.10	90	110	yes
Magnesium	mg/L	95.42	90	110	yes
Potassium	mg/L	97.51	90	110	yes
Silicon	mg/L	92.70	90	110	yes
Sodium	mg/L	94.60	90	110	yes

Date Acquired: September 27, 2018

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	40	37	20	0.050	yes
Magnesium	mg/L	4.6	4.3	20	0.050	yes
Potassium	mg/L	1.1	1.0	20	0.100	yes
Silicon	mg/L	6.2	5.9	20	0.100	yes
Sodium	mg/L	2.1	2.0	20	0.100	yes

Date Acquired: September 27, 2018

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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Mono-Aromatic Hydrocarbons - Soil

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Benzene	ng	0	-0.02	0.02	yes
Toluene	ng	0	-0.05	0.05	yes
Ethylbenzene	ng	0	-0.05	0.05	yes
o-Xylene	ng	0	-0.05	0.05	yes
m,p-Xylene	ng	0	-0.05	0.05	yes
Total Xylenes (m,p,o)	ng	0	-0.05	0.05	yes
Styrene	ng	0	-0.05	0.05	yes
Methyl t-Butyl Ether	ng	0	-0.05	0.05	yes
Toluene-d8	%	99.54	80.000	110.000	yes
Dibromofluoromethane	%	103.04	79.990	120.010	yes
4-Bromofluorobenzene	%	104.84	85.000	115.000	yes

Date Acquired: September 27, 2018

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Benzene	ng	115.40	80	120	yes
Toluene	ng	106.00	80	120	yes
Ethylbenzene	ng	119.20	80	120	yes
o-Xylene	ng	111.60	80	120	yes
m,p-Xylene	ng	111.00	80	120	yes
Total Xylenes (m,p,o)	ng	111.33	80	120	yes
Styrene	ng	112.80	80	120	yes
Methyl t-Butyl Ether	ng	115.00	80	120	yes
Toluene-d8	%	99.50	80	120	yes
Dibromofluoromethane	%	101.74	80	120	yes
4-Bromofluorobenzene	%	98.48	80	120	yes

Date Acquired: September 27, 2018

Benzene	ng	115.00	75	125	yes
Toluene	ng	101.00	75	125	yes
Ethylbenzene	ng	120.00	75	125	yes
o-Xylene	ng	109.00	75	125	yes
m,p-Xylene	ng	95.50	75	125	yes
Total Xylenes (m,p,o)	ng	100.00	75	125	yes
Styrene	ng	114.00	75	125	yes
Methyl t-Butyl Ether	ng	115.00	75	125	yes
Toluene-d8	%	98.80	85	115	yes
Dibromofluoromethane	%	96.52	85	115	yes
4-Bromofluorobenzene	%	99.24	85	115	yes

Date Acquired: September 27, 2018

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Benzene	µg/g	<0.02	<0.02	20	0.10	yes
Toluene	µg/g	<0.05	<0.05	20	0.10	yes
Ethylbenzene	µg/g	<0.05	<0.05	20	0.10	yes
o-Xylene	µg/g	<0.05	<0.05	20	0.10	yes
m,p-Xylene	µg/g	<0.05	<0.05	20	0.10	yes
Total Xylenes (m,p,o)	µg/g	<0.05	<0.05	20	0.10	yes

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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Mono-Aromatic Hydrocarbons - Soil - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Styrene	µg/g	<0.05	<0.05	20	0.10	yes
Methyl t-Butyl Ether	µg/g	<0.05	<0.05	20	0.10	yes
Date Acquired: September 27, 2018						
Matrix Spike	Units	% Recovery	Lower Limit	Upper Limit		Passed QC
Benzene	µg/g	116	80	120		yes
Toluene	µg/g	116	80	120		yes
Ethylbenzene	µg/g	108	80	120		yes
o-Xylene	µg/g	102	81	121		yes
m,p-Xylene	µg/g	104	80	120		yes
Total Xylenes (m,p,o)	µg/g	103	80	120		yes
Styrene	µg/g	119	80	120		yes
Methyl t-Butyl Ether	µg/g	114	80	120		yes
Date Acquired: September 27, 2018						

Mono-Aromatic Hydrocarbons - Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Benzene	ng	0	-0.5	0.5	yes
Ethylbenzene	ng	0	-0.5	0.5	yes
Methyl t-Butyl Ether	ng	0	-0.5	0.5	yes
m,p-Xylene	ng	0	-0.5	0.5	yes
o-Xylene	ng	0	-0.5	0.5	yes
Styrene	ng	0	-0.5	0.5	yes
Toluene	ng	0	-0.5	0.5	yes
Total Xylenes (m,p,o)	ng	0	-0.5	0.5	yes
Dibromofluoromethane	%	107.34	74.990	115.010	yes
Toluene-d8	%	102.1	80.000	110.000	yes
4-Bromofluorobenzene	%	108.34	85.000	115.000	yes
Date Acquired: September 27, 2018					
Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Benzene	ng	114.89	80	120	yes
Ethylbenzene	ng	118.60	80	120	yes
Methyl t-Butyl Ether	ng	114.54	80	120	yes
m,p-Xylene	ng	110.75	80	120	yes
o-Xylene	ng	111.03	80	120	yes
Styrene	ng	112.24	80	120	yes
Toluene	ng	105.62	80	120	yes
Total Xylenes (m,p,o)	ng	110.84	80	120	yes
Dibromofluoromethane	%	101.74	80	120	yes
Toluene-d8	%	99.50	80	120	yes
4-Bromofluorobenzene	%	98.48	80	120	yes
Date Acquired: September 27, 2018					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Benzene	µg/L	<0.5	<0.5	20	2.5	yes

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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Mono-Aromatic Hydrocarbons - Water -

Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Ethylbenzene	µg/L	<0.5	<0.5	20	2.5	yes
Methyl t-Butyl Ether	µg/L	<0.5	<0.5	20	2.5	yes
m,p-Xylene	µg/L	<0.5	<0.5	20	2.5	yes
o-Xylene	µg/L	<0.5	<0.5	20	2.5	yes
Styrene	µg/L	<0.5	<0.5	20	2.5	yes
Toluene	µg/L	<0.5	<0.5	20	2.5	yes
Total Xylenes (m,p,o)	µg/L	<0.5	<0.5	20	2.5	yes

Date Acquired: September 27, 2018

Matrix Spike	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Benzene	µg/L	116	80	120	yes
Ethylbenzene	µg/L	108	80	120	yes
Methyl t-Butyl Ether	µg/L	113	80	120	yes
m,p-Xylene	µg/L	103	80	120	yes
o-Xylene	µg/L	101	80	120	yes
Styrene	µg/L	118	80	120	yes
Toluene	µg/L	115	80	120	yes
Total Xylenes (m,p,o)	µg/L	102	80	120	yes

Date Acquired: September 27, 2018

PAH - Soil - Surrogate Recovery

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
2-Fluorobiphenyl	%	98.57	80	120	yes
Naphthalene-d8	%	97.96	80	120	yes
p-Terphenyl-d14	%	101.25	80	120	yes

Date Acquired: September 26, 2018

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
2-Fluorobiphenyl	%	63.52	70.04	20	0.150	yes
Naphthalene-d8	%	90.28	94.37	20	0.150	yes
p-Terphenyl-d14	%	71.22	71.29	20	0.150	yes

Date Acquired: September 26, 2018

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
2-Fluorobiphenyl	%	99.60	50.100	129.900	yes
Naphthalene-d8	%	99.63	50.100	129.900	yes
p-Terphenyl-d14	%	97.50	59.990	130.010	yes

Date Acquired: September 26, 2018

PAH - Water - Surrogate Recovery

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
2-Fluorobiphenyl	%	113.36	80	120	yes
p-Terphenyl-d14	%	98.91	80	120	yes
Naphthalene-d8	%	95.95	80	120	yes

Date Acquired: September 29, 2018

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
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Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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PAH - Water - Surrogate Recovery -

Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
2-Fluorobiphenyl	%	82.23	74.94	20	0.150	yes
p-Terphenyl-d14	%	105.32	106.36	20	0.250	yes
Naphthalene-d8	%	89.71	88.20	20	0.250	yes

Date Acquired: September 29, 2018

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
2-Fluorobiphenyl	%	82.23	50.100	129.900	yes
p-Terphenyl-d14	%	105.32	59.990	130.010	yes
Naphthalene-d8	%	89.71	50.100	129.900	yes

Date Acquired: September 29, 2018

Polycyclic Aromatic Hydrocarbons - Soil

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
2-Methylnaphthalene	ng/mL	0	-0.030	0.030	yes
Acenaphthene	ng/mL	0	-0.030	0.030	yes
Acenaphthylene	ng/mL	0	-0.030	0.030	yes
Anthracene	ng/mL	0	-0.030	0.030	yes
Benzo(a)anthracene	ng/mL	0	-0.030	0.030	yes
Benzo(a)pyrene	ng/mL	0	-0.030	0.030	yes
Benzo(b)fluoranthene	ng/mL	0	-0.030	0.030	yes
Benzo(g,h,i)perylene	ng/mL	0	-0.030	0.030	yes
Benzo(k)fluoranthene	ng/mL	0	-0.030	0.030	yes
Chrysene	ng/mL	0	-0.030	0.030	yes
Dibenzo(a,h)anthracene	ng/mL	0	-0.030	0.030	yes
Fluoranthene	ng/mL	0	-0.030	0.030	yes
Fluorene	ng/mL	0	-0.030	0.030	yes
Indeno(1,2,3-c,d)pyrene	ng/mL	0	-0.030	0.030	yes
Naphthalene	ng/mL	0	-0.030	0.030	yes
Phenanthrene	ng/mL	0	-0.030	0.030	yes
Pyrene	ng/mL	0	-0.030	0.030	yes

Date Acquired: September 26, 2018

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
2-Methylnaphthalene	ng/mL	98.93	80	120	yes
Acenaphthene	ng/mL	99.59	80	120	yes
Acenaphthylene	ng/mL	97.22	80	120	yes
Anthracene	ng/mL	99.20	80	120	yes
Benzo(a)anthracene	ng/mL	98.13	80	120	yes
Benzo(a)pyrene	ng/mL	100.20	80	120	yes
Benzo(b)fluoranthene	ng/mL	98.89	80	120	yes
Benzo(g,h,i)perylene	ng/mL	97.05	80	120	yes
Benzo(j)fluoranthene	ng/mL	107.11	80	120	yes
Benzo(k)fluoranthene	ng/mL	97.29	80	120	yes
Dibenzo(a,h)anthracene	ng/mL	101.35	80	120	yes
Fluoranthene	ng/mL	97.75	80	120	yes

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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Polycyclic Aromatic Hydrocarbons - Soil -

Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Fluorene	ng/mL	97.80	80	120	yes
Indeno(1,2,3-c,d)pyrene	ng/mL	97.94	80	120	yes
Naphthalene	ng/mL	98.80	80	120	yes
Phenanthrene	ng/mL	100.23	80	120	yes
Pyrene	ng/mL	99.07	80	120	yes

Date Acquired: September 26, 2018

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
2-Methylnaphthalene	µg/g	<0.03	<0.03	20	0.150	yes
Acenaphthene	µg/g	<0.03	<0.03	20	0.150	yes
Acenaphthylene	µg/g	<0.03	<0.03	20	0.150	yes
Anthracene	µg/g	<0.03	<0.03	20	0.150	yes
Benzo(a)anthracene	µg/g	<0.03	<0.03	20	0.150	yes
Benzo(a)pyrene	µg/g	<0.03	<0.03	20	0.150	yes
Benzo(b)fluoranthene	µg/g	<0.03	<0.03	20	0.150	yes
Benzo(g,h,i)perylene	µg/g	<0.03	<0.03	20	0.150	yes
Benzo(k)fluoranthene	µg/g	<0.03	<0.03	20	0.150	yes
Chrysene	µg/g	<0.03	<0.03	20	0.150	yes
Dibenzo(a,h)anthracene	µg/g	<0.03	<0.03	20	0.150	yes
Fluoranthene	µg/g	<0.03	<0.03	20	0.150	yes
Fluorene	µg/g	<0.03	<0.03	20	0.150	yes
Indeno(1,2,3-c,d)pyrene	µg/g	<0.03	<0.03	20	0.150	yes
Naphthalene	µg/g	<0.03	<0.03	20	0.150	yes
Phenanthrene	µg/g	<0.03	<0.03	20	0.150	yes
Pyrene	µg/g	<0.03	<0.03	20	0.150	yes

Date Acquired: September 26, 2018

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
2-Methylnaphthalene	µg/g	95.85	50.010	129.990	yes
Acenaphthene	µg/g	95.53	50.010	129.990	yes
Acenaphthylene	µg/g	89.70	50.010	129.990	yes
Anthracene	µg/g	88.19	59.990	130.010	yes
Benzo(a)anthracene	µg/g	90.62	59.990	130.010	yes
Benzo(a)pyrene	µg/g	89.42	59.990	130.010	yes
Benzo(b)fluoranthene	µg/g	83.13	59.990	130.010	yes
Benzo(g,h,i)perylene	µg/g	87.88	59.990	130.010	yes
Benzo(k)fluoranthene	µg/g	88.57	59.990	130.010	yes
Chrysene	µg/g	100.22	59.990	130.010	yes
Dibenzo(a,h)anthracene	µg/g	88.79	59.990	130.010	yes
Fluoranthene	µg/g	90.51	59.990	130.010	yes
Fluorene	µg/g	91.91	50.010	129.990	yes
Indeno(1,2,3-c,d)pyrene	µg/g	85.23	59.990	130.010	yes
Naphthalene	µg/g	98.43	50.010	129.990	yes
Phenanthrene	µg/g	94.37	59.990	130.010	yes
Pyrene	µg/g	91.50	59.990	130.010	yes

Date Acquired: September 26, 2018

Quality Control

Bill To: TerraWest Environmental Inc.	Project ID: 2018447.01	Lot ID: 1300986
206, 2800 Bryn Maur Road	Project Name: DCMM18-01	Control Number:
Victoria, BC, Canada	Project Location: Port Alberni	Date Received: Sep 27, 2018
V9B 3T4	LSD:	Date Reported: Oct 22, 2018
Attn: Accounts Payable	P.O.:	Report Number: 2327037
Sampled By: Derek Nickel	Proj. Acct. code:	
Company: TerraWest		

Polycyclic Aromatic Hydrocarbons - Soil - Continued

Polycyclic Aromatic Hydrocarbons - Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Acenaphthene	ng/mL	0	-0.099	0.099	yes
Acenaphthylene	ng/mL	0	-0.099	0.099	yes
Acridine	ng/mL	0	-0.050	0.050	yes
Anthracene	ng/mL	0	-0.099	0.099	yes
Benzo(a)anthracene	ng/mL	0	-0.009	0.009	yes
Benzo(a)pyrene	ng/mL	0	-0.009	0.009	yes
Benzo(b)fluoranthene	ng/mL	0	-0.009	0.009	yes
Benzo(g,h,i)perylene	ng/mL	0	-0.099	0.099	yes
Benzo(k)fluoranthene	ng/mL	0	-0.020	0.020	yes
Chrysene	ng/mL	0	-0.099	0.099	yes
Dibenzo(a,h)anthracene	ng/mL	0	-0.009	0.009	yes
Fluoranthene	ng/mL	0	-0.099	0.099	yes
Fluorene	ng/mL	0	-0.099	0.099	yes
Indeno(1,2,3-c,d)pyrene	ng/mL	0	-0.099	0.099	yes
Naphthalene	ng/mL	0	-0.099	0.099	yes
Phenanthrene	ng/mL	0	-0.099	0.099	yes
Pyrene	ng/mL	0	-0.020	0.020	yes
Quinoline	ng/mL	0	-0.099	0.099	yes

Date Acquired: September 29, 2018

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Acenaphthene	ng/mL	103.40	80	120	yes
Acenaphthylene	ng/mL	116.79	80	120	yes
Acridine	ng/mL	97.27	80	120	yes
Anthracene	ng/mL	112.12	80	120	yes
Benzo(a)anthracene	ng/mL	106.98	80	120	yes
Benzo(a)pyrene	ng/mL	103.28	80	120	yes
Benzo(b)fluoranthene	ng/mL	103.76	80	120	yes
Benzo(g,h,i)perylene	ng/mL	94.00	80	120	yes
Benzo(j)fluoranthene	ng/mL	91.47	80	120	yes
Benzo(k)fluoranthene	ng/mL	112.80	80	120	yes
Chrysene	ng/mL	100.61	80	120	yes
Dibenzo(a,h)anthracene	ng/mL	99.58	80	120	yes
Fluoranthene	ng/mL	102.74	80	120	yes
Fluorene	ng/mL	104.11	80	120	yes
Indeno(1,2,3-c,d)pyrene	ng/mL	97.24	80	120	yes
Naphthalene	ng/mL	103.89	80	120	yes
Phenanthrene	ng/mL	106.21	80	120	yes
Pyrene	ng/mL	110.08	80	120	yes
Quinoline	ng/mL	96.15	80	120	yes

Date Acquired: September 29, 2018

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
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Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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Polycyclic Aromatic Hydrocarbons - Water - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Acenaphthene	µg/L	<0.1	<0.1	20	0.500	yes
Acenaphthylene	µg/L	<0.1	<0.1	20	0.500	yes
Acridine	µg/L	0.11	0.11	20	0.250	yes
Anthracene	µg/L	<0.1	<0.1	20	0.500	yes
Benzo(a)anthracene	µg/L	0.10	0.10	20	0.050	yes
Benzo(a)pyrene	µg/L	0.10	0.10	20	0.050	yes
Benzo(b)fluoranthene	µg/L	0.10	0.11	20	0.050	yes
Benzo(g,h,i)perylene	µg/L	0.1	0.1	20	0.500	yes
Benzo(k)fluoranthene	µg/L	0.10	0.10	20	0.100	yes
Chrysene	µg/L	0.1	0.1	20	0.500	yes
Dibenzo(a,h)anthracene	µg/L	0.10	0.11	20	0.050	yes
Fluoranthene	µg/L	0.1	0.1	20	0.500	yes
Fluorene	µg/L	0.1	0.1	20	0.500	yes
Indeno(1,2,3-c,d)pyrene	µg/L	0.1	0.1	20	0.500	yes
Naphthalene	µg/L	<0.1	<0.1	20	0.500	yes
Phenanthrene	µg/L	<0.1	<0.1	20	0.500	yes
Pyrene	µg/L	0.11	0.11	20	0.100	yes
Quinoline	µg/L	0.11	0.11	20	1.700	yes

Date Acquired: September 29, 2018

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Acenaphthene	µg/L	92.8	50.010	129.990	yes
Acenaphthylene	µg/L	94.3	50.010	129.990	yes
Acridine	µg/L	108.39	59.990	130.010	yes
Anthracene	µg/L	97.7	59.990	130.010	yes
Benzo(a)anthracene	µg/L	100.80	59.990	130.010	yes
Benzo(a)pyrene	µg/L	98.79	59.990	130.010	yes
Benzo(b)fluoranthene	µg/L	103.03	59.990	130.010	yes
Benzo(g,h,i)perylene	µg/L	102.0	59.990	130.010	yes
Benzo(k)fluoranthene	µg/L	98.19	59.990	130.010	yes
Chrysene	µg/L	103.8	59.990	130.010	yes
Dibenzo(a,h)anthracene	µg/L	103.54	59.990	130.010	yes
Fluoranthene	µg/L	109.7	59.990	130.010	yes
Fluorene	µg/L	103.7	50.010	129.990	yes
Indeno(1,2,3-c,d)pyrene	µg/L	103.0	59.990	130.010	yes
Naphthalene	µg/L	99.8	50.010	129.990	yes
Phenanthrene	µg/L	99.8	59.990	130.010	yes
Pyrene	µg/L	111.13	59.990	130.010	yes
Quinoline	µg/L	108.60	50.010	129.990	yes

Date Acquired: September 29, 2018

Routine Water

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Hardness	mg CaCO ₃ /L	118	110	20	1.000	yes

Date Acquired: September 27, 2018

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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Routine Water - Continued

Soil Acidity

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH	pH	5.5	5.5	0		yes
Date Acquired: October 03, 2018						
Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
pH	pH	4.0	3.9	4.1		yes
Date Acquired: October 03, 2018						
pH	pH	7.9	7.9	8.1		yes
Date Acquired: October 03, 2018						
pH	pH	7.3	7.0	7.6		yes
Date Acquired: October 03, 2018						

Trace Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	0	-0.990	0.990	yes
Antimony	µg/L	-0.00100894	-0.020	0.020	yes
Arsenic	µg/L	0.000575845	-0.099	0.099	yes
Barium	µg/L	-0.0436569	-0.099	0.099	yes
Beryllium	µg/L	0.00659792	-0.050	0.050	yes
Bismuth	µg/L	-0.000768981	-0.099	0.099	yes
Boron	µg/L	-0.690529	-2.001	2.001	yes
Cadmium	µg/L	-0.00173009	-0.010	0.010	yes
Chromium	µg/L	-0.0288322	-0.050	0.050	yes
Cobalt	µg/L	-0.00231552	-0.020	0.020	yes
Copper	µg/L	0.00720172	-0.501	0.501	yes
Iron	µg/L	-1.48444	-2.001	2.001	yes
Lead	µg/L	0	-0.010	0.010	yes
Lithium	µg/L	4.3646e-005	-0.501	0.501	yes
Manganese	µg/L	0.0462714	-0.990	0.990	yes
Molybdenum	µg/L	-0.00228605	-0.020	0.020	yes
Nickel	µg/L	0.0152424	-0.201	0.201	yes
Selenium	µg/L	0.011161	-0.201	0.201	yes
Silver	µg/L	-0.00057429	-0.010	0.010	yes
Strontium	µg/L	-0.0290046	-0.099	0.099	yes
Tellurium	µg/L	-0.0227524	-0.050	0.050	yes
Thallium	µg/L	-0.000527096	-0.010	0.010	yes
Thorium	µg/L	-0.000175946	-0.050	0.050	yes
Tin	µg/L	0.0223038	-0.099	0.099	yes
Titanium	µg/L	-0.0811536	-0.099	0.099	yes
Uranium	µg/L	-0.000385229	-0.099	0.099	yes
Vanadium	µg/L	-0.0430993	-0.050	0.050	yes
Zinc	µg/L	0	-0.501	0.501	yes
Zirconium	µg/L	0.00685125	-0.099	0.099	yes
Date Acquired: September 27, 2018					

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Proj. Acct. code:	

Trace Metals Total - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	112.76	80	120	yes
Antimony	µg/L	93.09	90	110	yes
Arsenic	µg/L	95.46	90	110	yes
Barium	µg/L	96.66	90	110	yes
Beryllium	µg/L	93.49	90	110	yes
Boron	µg/L	100.69	70	130	yes
Cadmium	µg/L	93.67	90	110	yes
Chromium	µg/L	94.10	90	110	yes
Cobalt	µg/L	97.74	90	110	yes
Copper	µg/L	96.38	90	110	yes
Lead	µg/L	92.69	90	110	yes
Lithium	µg/L	95.66	90	110	yes
Molybdenum	µg/L	97.38	90	110	yes
Nickel	µg/L	98.28	90	110	yes
Selenium	µg/L	96.43	90	110	yes
Silver	µg/L	98.08	90	110	yes
Strontium	µg/L	97.99	90	110	yes
Thallium	µg/L	99.30	90	110	yes
Thorium	µg/L	93.34	90	110	yes
Tin	µg/L	94.96	90	110	yes
Titanium	µg/L	105.07	90	110	yes
Uranium	µg/L	90.40	90	110	yes
Vanadium	µg/L	93.54	90	110	yes
Zinc	µg/L	101.19	90	110	yes
Date Acquired: September 27, 2018					
Aluminum	µg/L	92.86	80	120	yes
Antimony	µg/L	95.29	90	110	yes
Arsenic	µg/L	92.92	90	110	yes
Barium	µg/L	96.54	90	110	yes
Beryllium	µg/L	95.77	90	110	yes
Boron	µg/L	93.56	80	120	yes
Cadmium	µg/L	95.94	90	110	yes
Chromium	µg/L	94.87	90	110	yes
Cobalt	µg/L	95.61	90	110	yes
Copper	µg/L	91.52	90	110	yes
Lead	µg/L	93.23	90	110	yes
Lithium	µg/L	94.87	90	110	yes
Molybdenum	µg/L	96.87	90	110	yes
Nickel	µg/L	96.06	90	110	yes
Selenium	µg/L	96.05	90	110	yes
Silver	µg/L	98.17	90	110	yes
Strontium	µg/L	96.26	90	110	yes
Thallium	µg/L	96.28	90	110	yes
Thorium	µg/L	93.98	90	110	yes
Tin	µg/L	93.28	90	110	yes

Quality Control

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4 Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.: Proj. Acct. code:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
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Trace Metals Total - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Titanium	µg/L	92.42	90	110	yes
Uranium	µg/L	90.14	90	110	yes
Vanadium	µg/L	92.73	90	110	yes
Zinc	µg/L	93.37	90	110	yes
Date Acquired: September 27, 2018					

Volatile Petroleum Hydrocarbons - Soil

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
VHs6-10	ng	0	-50	50	yes
VPHs (VHs6-10 minus	ng	0	-50	50	yes

Date Acquired: September 27, 2018

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
VHs6-10	ng	81.89	80	120	yes
Date Acquired: September 27, 2018					
VHs6-10	ng	88.11	75	125	yes
VPHs (VHs6-10 minus	ng	3.82	75	125	yes

Date Acquired: September 27, 2018

VHs6-10	ng	116.67	50	150	yes
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Date Acquired: September 27, 2018

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
VHs6-10	µg/g	<50	<50	20	10	yes
VPHs (VHs6-10 minus	µg/g	<50	<50	20	10	yes
VHs6-oXylene	µg/g	<50	<50	20	10	yes
VHsoXylene-10	µg/g	<50	<50	20	10	yes

Date Acquired: September 27, 2018

Matrix Spike	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
VHs6-10	µg/g	95	80	120	yes

Date Acquired: September 27, 2018

Volatile Petroleum Hydrocarbons - Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
VPHw (VHw6-10 minus	ng	0	-50	50	yes
VHw6-10	ng	0	-50	50	yes

Date Acquired: September 27, 2018

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
VHw6-10	ng	98.07	80	120	yes

Date Acquired: September 27, 2018

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
VPHw (VHw6-10 minus	µg/L	<50	<50	20	100	yes
VHw6-10	µg/L	<50	<50	20	100	yes

Date Acquired: September 27, 2018

Matrix Spike	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
VHw6-10	µg/L	96	80	120	yes

Quality Control

Bill To:	TerraWest Environmental Inc.	Project ID:	2018447.01	Lot ID:	1300986
	206, 2800 Bryn Maur Road	Project Name:	DCMM18-01	Control Number:	
	Victoria, BC, Canada	Project Location:	Port Alberni	Date Received:	Sep 27, 2018
	V9B 3T4	LSD:		Date Reported:	Oct 22, 2018
Attn:	Accounts Payable	P.O.:		Report Number:	2327037
Sampled By:	Derek Nickel	Proj. Acct. code:			
Company:	TerraWest				

Volatile Petroleum Hydrocarbons - Water

- Continued

Matrix Spike	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Date Acquired:	September 27, 2018				

Methodology and Notes

Bill To: TerraWest Environmental Inc. 206, 2800 Bryn Maur Road Victoria, BC, Canada V9B 3T4	Project ID: 2018447.01 Project Name: DCMM18-01 Project Location: Port Alberni LSD: P.O.:	Lot ID: 1300986 Control Number: Date Received: Sep 27, 2018 Date Reported: Oct 22, 2018 Report Number: 2327037
Attn: Accounts Payable Sampled By: Derek Nickel Company: TerraWest	Proj. Acct. code:	

Method of Analysis

Method Name	Reference	Method	Date Analysis Started	Location
BTEX-VPH - Soil (Surrey)	BCELM	* Volatile Hydrocarbons in Solids by GC/FID, VH Solids	Sep 27, 2018	Exova Surrey
BTEX-VPH - Water (MS) (Surrey)	B.C.M.O.E	* Volatile Hydrocarbons in Waters by GC/FID (April, 2007), CSR	Sep 27, 2018	Exova Surrey
BTEX-VPH - Water (MS) (Surrey)	BCELM	* Volatile Hydrocarbons in Water by GC/FID, VH Water	Sep 27, 2018	Exova Surrey
EPH - Soil	B.C.M.O.E	* EPH in Solids by GC/FID (Dec. 31, 2000), EPH in Solids	Sep 27, 2018	Exova Surrey
EPH - Soil	BCELM	* Extractable Petroleum Hydrocarbons (EPH) in Solids by GC/FID, EPH Solids	Sep 27, 2018	Exova Surrey
EPH - Water (Surrey)	BCELM	Calculation of Light and Heavy Extractable Petroleum Hydrocarbons in Solids or Waters (LEPH & HEPH)., LEPH/HEPH Calculation	Sep 28, 2018	Exova Surrey
EPH - Water (Surrey)	BCELM	* Extractable Petroleum Hydrocarbons (EPH) in Water by GC/FID, EPH Water	Sep 28, 2018	Exova Surrey
Metals (Strong Acid Leachable) in soils (Surrey)	B.C.M.O.E	* Strong Acid Leachable Metals (SALM) in Soil, V 1.0, SALM	Oct 1, 2018	Exova Surrey
Metals (Strong Acid Leachable) in soils (Surrey)	US EPA	* Mercury in Solid and Semi-Solid Wastes (Cold Vapour), 7471B	Oct 1, 2018	Exova Surrey
PAH - Soil (Surrey)	BCELM	* Polycyclic Aromatic Hydrocarbons in Solids by GC/MS - PBM, PAH Solids	Sep 27, 2018	Exova Surrey
PAH - Soil (Surrey)	US EPA	* Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry, 8270	Sep 27, 2018	Exova Surrey
PAH - Water (Surrey)	BCELM	* Polycyclic Aromatic Hydrocarbons in Water by GC/MS - PBM, PAH Water	Sep 29, 2018	Exova Surrey
PAH - Water (Surrey)	BCELM	* Polycyclic Aromatic Hydrocarbons in Water by GC/MS - PBM, PAH Water	Oct 1, 2018	Exova Surrey
PCP - Soil	US EPA	* Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry, 8270	Sep 28, 2018	Exova Calgary
pH and EC - 1:2 (Surrey)	Carter	* Soil pH (1:2 Water), 16.2	Oct 1, 2018	Exova Surrey
Trace Metals (Total) in Water (Surrey)	US EPA	* Determination of Trace Elements in Waters and Wastes by ICP-MS, 200.8	Sep 27, 2018	Exova Surrey

* Reference Method Modified

References

B.C.M.O.E	B.C. Ministry of Environment
BCELM	B.C. Environmental Laboratory Manual
Carter	Soil Sampling and Methods of Analysis.
US EPA	US Environmental Protection Agency Test Methods

Comments:

- Sep 28, 2018 - Reduction of analytical volume was necessary for metals analysis to bring results within the analytical range for samples. Detection

Methodology and Notes

Bill To:	TerraWest Environmental Inc.	Project ID:	2018447.01	Lot ID:	1300986
	206, 2800 Bryn Maur Road	Project Name:	DCMM18-01	Control Number:	
	Victoria, BC, Canada	Project Location:	Port Alberni	Date Received:	Sep 27, 2018
	V9B 3T4	LSD:		Date Reported:	Oct 22, 2018
Attn:	Accounts Payable	P.O.:		Report Number:	2327037
Sampled By:	Derek Nickel	Proj. Acct. code:			
Company:	TerraWest				

limits are adjusted accordingly.

- Oct 22, 2018 - Dioxin and furan analysis was performed by a subcontract laboratory. See attached 7 page report PR182812.

Please direct any inquiries regarding this report to our Client Services Group or to the Operations Manager at the coordinates indicated at the top left of this page.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

SAMPLE RECEIPT FORM / CHEMICAL ANALYSIS FORM

FILE #: PR182812

CLIENT: Exova
#104, 19575 55A Avenue
Surrey, BC
V3S 8P8

Phone: (604) 514-3322
Fax: (604) 514-3323
Email: Surrey@exova.com

RECEIVED BY: M. Cavaliere
CONDITION: Okay, 16.8°C

DATE/TIME: September 27, 2018 (11:30 a.m.)

# of Containers	Sample Type	Sample (Client Codes)	Lab Codes	Test Requested
		PO#: POC113407		
1	Soil	1300986-1	PR182812	PCDD/F
1	Soil	1300986-2	PR182813	PCDD/F
1	Soil	1300986-3	PR182814	PCDD/F

STORAGE: Stored at <-10°C.

ANALYTES: HRGC/HRMS analysis for polychlorinated dibenzo(p)dioxins and dibenzofurans (PCDD/F).

SPECIAL INSTRUCTIONS: none

METHODOLOGY

Reference Method: PCDD/F: SOP LAB01; EPA Method 1613b

Data summarized in Data Report Attached

Report sent to: Client Services

Date: October 22, 2018

Comments: Results relate only to items tested.



Digitally signed by Patrick Pond
DN: cn=Patrick Pond, o=Pacific
Rim Laboratories Inc.,
ou=CTO,
email=Pat@pacificrimlabs.com,
c=CA
Date: 2018.10.22 15:12:50
-07'00'

Patrick Pond, C. Chem, CTO

DATA REPORT

Client: Exova Surrey
 Client ID: 1390086-1
 PRL ID: PR182812

Contact: Client Services
 Date Extracted: 04-Oct-18
 Date Analysed: 18-Oct-18

DIOXINS			Surrogate Recoveries
Congeners	Conc. ng/kg	DL ng/kg	%
2,3,7,8-TCDD	2.1	0.2	84
Total TCDD	30	0.2	
1,2,3,7,8-PeCDD	32	0.3	74
Total PeCDD	140	0.3	
1,2,3,4,7,8-HxCDD	76	0.5	86
1,2,3,6,7,8-HxCDD	210	0.5	
1,2,3,7,8,9-HxCDD	81	0.5	-
Total HxCDD	1100	0.5	
1,2,3,4,6,7,8-HpCDD	3800	0.7	98
Total HpCDD	7200	0.7	
OCDD	11000	1	108
Total Dioxin TEQ			

I-TEQs	
(ND=0) ng/kg	(ND=DL) ng/kg
2.1	2.1
16	16
7.6	7.6
21	21
8.1	8.1
38	38
11	11
104	104

WHO-TEQs (2005)	
(ND=0) ng/kg	(ND=DL) ng/kg
2.1	2.1
32	32
7.6	7.6
21	21
8.1	8.1
38	38
3.3	3.3
112	112

FURANS			Surrogate Recoveries
Congeners	ng/kg	DL ng/kg	
2,3,7,8-TCDF	4.2	0.2	64
Total TCDF	88	0.2	
1,2,3,7,8-PeCDF	7.2	0.3	68
2,3,4,7,8-PeCDF	9.7	0.3	
Total PeCDF	280	0.3	76
1,2,3,4,7,8-HxCDF	31	0.5	
1,2,3,6,7,8-HxCDF	30	0.5	80
1,2,3,7,8,9-HxCDF	14	0.5	
2,3,4,6,7,8-HxCDF	54	0.5	92
Total HxCDF	870	0.5	
1,2,3,4,6,7,8-HpCDF	830	0.7	98
1,2,3,4,7,8,9-HpCDF	95	0.7	
Total HpCDF	3600	0.7	-
OCDF	2000	1	
Total Furan TEQ			

I-TEQs	
(ND=0) ng/kg	(ND=DL) ng/kg
0.42	0.42
0.36	0.36
4.85	4.85
3.1	3.1
3	3
1.4	1.4
5.4	5.4
8.3	8.3
0.95	0.95
2	2
30	30

WHO-TEQs (2005)	
(ND=0) ng/kg	(ND=DL) ng/kg
0.42	0.42
0.216	0.216
2.91	2.91
3.1	3.1
3	3
1.4	1.4
5.4	5.4
8.3	8.3
0.95	0.95
0.6	0.6
26	26

Total PCDD/PCDF Toxic Equivalent

133.58	133.58
--------	--------

138.40	138.40
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ND - none detected

DATA REPORT

Client: Exova Surrey
 Client ID: 1390086-2
 PRL ID: PR182813

Contact: Client Services
 Date Extracted: 04-Oct-18
 Date Analysed: 18-Oct-18

DIOXINS			Surrogate Recoveries
Congeners	Conc. ng/kg	DL ng/kg	
2,3,7,8-TCDD	ND	0.2	68
Total TCDD	2.9	0.2	
1,2,3,7,8-PeCDD	2.6	0.3	68
Total PeCDD	2.9	0.3	
1,2,3,4,7,8-HxCDD	ND	0.5	78
1,2,3,6,7,8-HxCDD	5.4	0.5	84
1,2,3,7,8,9-HxCDD	2.7	0.5	-
Total HxCDD	45	0.5	
1,2,3,4,6,7,8-HpCDD	140	0.7	78
Total HpCDD	350	0.7	
OCDD	1300	1	92
Total Dioxin TEQ			

I-TEQs	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.2
1.3	1.3
ND	0.05
0.54	0.54
0.27	0.27
1.4	1.4
1.3	1.3
4.8	5.1

WHO-TEQs (2005)	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.2
2.6	2.6
ND	0.05
0.54	0.54
0.27	0.27
1.4	1.4
0.39	0.39
5.2	5.5

FURANS			Surrogate Recoveries
Congeners	ng/kg	DL ng/kg	
2,3,7,8-TCDF	ND	0.2	54
Total TCDF	17	0.2	
1,2,3,7,8-PeCDF	0.72	0.3	58
2,3,4,7,8-PeCDF	1.2	0.3	76
Total PeCDF	19	0.3	
1,2,3,4,7,8-HxCDF	1.1	0.5	72
1,2,3,6,7,8-HxCDF	1.9	0.5	76
1,2,3,7,8,9-HxCDF	ND	0.5	72
2,3,4,6,7,8-HxCDF	2.6	0.5	90
Total HxCDF	32	0.5	
1,2,3,4,6,7,8-HpCDF	27	0.7	86
1,2,3,4,7,8,9-HpCDF	2.4	0.7	78
Total HpCDF	110	0.7	
OCDF	91	1	-
Total Furan TEQ			

I-TEQs	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.02
0.04	0.04
0.60	0.60
0.11	0.11
0.19	0.19
ND	0.05
0.26	0.26
0.27	0.27
0.02	0.02
0.09	0.09
1.6	1.7

WHO-TEQs (2005)	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.02
0.02	0.02
0.36	0.36
0.11	0.11
0.19	0.19
ND	0.05
0.26	0.26
0.27	0.27
0.02	0.02
0.03	0.03
1.3	1.3

Total PCDD/PCDF Toxic Equivalent

6.39	6.71
------	------

6.46	6.78
------	------

ND - none detected

DATA REPORT

Client: Exova Surrey
 Client ID: 1390086-3
 PRL ID: PR182814

Contact: Client Services
 Date Extracted: 04-Oct-18
 Date Analysed: 18-Oct-18
 ###

DIOXINS			Surrogate Recoveries
Congeners	Conc. ng/kg	DL ng/kg	%
2,3,7,8-TCDD	ND	0.2	52
Total TCDD	2.1	0.2	
1,2,3,7,8-PeCDD	ND	0.3	58
Total PeCDD	ND	0.3	
1,2,3,4,7,8-HxCDD	ND	0.5	64
1,2,3,6,7,8-HxCDD	ND	0.5	68
1,2,3,7,8,9-HxCDD	1.3	0.5	-
Total HxCDD	28	0.5	
1,2,3,4,6,7,8-HpCDD	41	0.7	68
Total HpCDD	89	0.7	
OCDD	320	1	76
Total Dioxin TEQ			

I-TEQs	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.2
ND	0.15
ND	0.05
ND	0.05
0.13	0.13
0.41	0.41
0.32	0.32
0.86	1.3

WHO-TEQs (2005)	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.2
ND	0.3
ND	0.05
ND	0.05
0.13	0.13
0.41	0.41
0.10	0.10
0.64	1.2

FURANS			Surrogate Recoveries
Congeners	ng/kg	DL ng/kg	%
2,3,7,8-TCDF	ND	0.2	48
Total TCDF	8.2	0.2	
1,2,3,7,8-PeCDF	ND	0.3	52
2,3,4,7,8-PeCDF	ND	0.3	56
Total PeCDF	25	0.3	
1,2,3,4,7,8-HxCDF	ND	0.5	56
1,2,3,6,7,8-HxCDF	0.94	0.5	62
1,2,3,7,8,9-HxCDF	ND	0.5	64
2,3,4,6,7,8-HxCDF	0.78	0.5	74
Total HxCDF	14	0.5	
1,2,3,4,6,7,8-HpCDF	6.1	0.7	70
1,2,3,4,7,8,9-HpCDF	0.8	0.7	60
Total HpCDF	23	0.7	
OCDF	18	1	-
Total Furan TEQ			

I-TEQs	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.02
ND	0.015
ND	0.15
ND	0.05
0.094	0.094
ND	0.05
0.078	0.078
0.06	0.06
0.01	0.01
0.02	0.02
0.26	0.54

WHO-TEQs (2005)	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.02
ND	0.009
ND	0.09
ND	0.05
0.094	0.094
ND	0.05
0.078	0.078
0.06	0.06
0.01	0.01
0.01	0.01
0.25	0.47

Total PCDD/PCDF Toxic Equivalent

1.12	1.85
------	------

0.88	1.70
------	------

ND - none detected

QC REPORT - BLANK

Client: Exova Surrey
 Client ID: BLANK
 PRL ID: DF180817B

Contact: Client Services
 Date Extracted: 04-Oct-18
 Date Analysed: 18-Oct-18

DIOXINS			Surrogate Recoveries
Congeners	Conc. ng/kg	DL ng/kg	%
2,3,7,8-TCDD	ND	0.2	46
Total TCDD	ND	0.2	
1,2,3,7,8-PeCDD	ND	0.3	62
Total PeCDD	ND	0.3	
1,2,3,4,7,8-HxCDD	ND	0.5	74
1,2,3,6,7,8-HxCDD	ND	0.5	80
1,2,3,7,8,9-HxCDD	ND	0.5	-
Total HxCDD	ND	0.5	
1,2,3,4,6,7,8-HpCDD	ND	0.7	82
Total HpCDD	ND	0.7	
OCDD	ND	1	86
Total Dioxin TEQ			

I-TEQs	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.2
ND	0.15
ND	0.05
ND	0.05
ND	0.05
ND	0.007
ND	0.001
0.00	0.51

WHO-TEQs (2005)	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.2
ND	0.3
ND	0.05
ND	0.05
ND	0.05
ND	0.007
ND	0.0003
0.00	0.66

FURANS			Surrogate Recoveries
Congeners	ng/kg	DL ng/kg	%
2,3,7,8-TCDF	ND	0.2	36
Total TCDF	ND	0.2	
1,2,3,7,8-PeCDF	ND	0.3	50
2,3,4,7,8-PeCDF	ND	0.3	60
Total PeCDF	ND	0.3	
1,2,3,4,7,8-HxCDF	ND	0.5	60
1,2,3,6,7,8-HxCDF	ND	0.5	64
1,2,3,7,8,9-HxCDF	ND	0.5	74
2,3,4,6,7,8-HxCDF	ND	0.5	86
Total HxCDF	ND	0.5	
1,2,3,4,6,7,8-HpCDF	ND	0.7	74
1,2,3,4,7,8,9-HpCDF	ND	0.7	74
Total HpCDF	ND	0.7	
OCDF	ND	1	-
Total Furan TEQ			

I-TEQs	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.02
ND	0.015
ND	0.15
ND	0.05
ND	0.05
ND	0.05
ND	0.05
ND	0.007
ND	0.007
ND	0.001
0.00	0.40

WHO-TEQs (2005)	
(ND=0) ng/kg	(ND=DL) ng/kg
ND	0.02
ND	0.009
ND	0.09
ND	0.05
ND	0.05
ND	0.05
ND	0.05
ND	0.007
ND	0.007
ND	0.0003
0.00	0.33

Total PCDD/PCDF Toxic Equivalent

0.00	0.91
------	------

0.00	0.99
------	------

ND - none detected

Acronyms used in reporting dioxins and furans:

TCDD = Tetrachlorodibenzo-*p*-dioxin
 PeCDD = Pentachlorodibenzo-*p*-dioxin
 HxCDD = Hexachlorodibenzo-*p*-dioxin
 HpCDD = Heptachlorodibenzo-*p*-dioxin
 OCDD = Octachlorodibenzo-*p*-dioxin

TCDF = Tetrachlorodibenzofuran
 PeCDF = Pentachlorodibenzofuran
 HxCDF = Hexachlorodibenzofuran
 HpCDF = Heptachlorodibenzofuran
 OCDF = Octachlorodibenzofuran

Acceptable recoveries for surrogates**EPA 1613**

	Min (%)	Max (%)
¹³ C ₁₂ -2,3,7,8-TCDD	25	164
¹³ C ₁₂ -1,2,3,7,8-PeCDD	25	181
¹³ C ₁₂ -1,2,3,4,7,8-HxCDD	32	141
¹³ C ₁₂ -1,2,3,6,7,8-HxCDD	28	130
¹³ C ₁₂ -1,2,3,4,6,7,8-HpCDD	23	140
¹³ C ₁₂ -OCDD	17	157
¹³ C ₁₂ -2,3,7,8-TCDF	24	169
¹³ C ₁₂ -1,2,3,7,8-PeCDF	24	185
¹³ C ₁₂ -2,3,4,7,8-PeCDF	21	178
¹³ C ₁₂ -1,2,3,4,7,8-HxCDF	26	152
¹³ C ₁₂ -1,2,3,6,7,8-HxCDF	26	123
¹³ C ₁₂ -1,2,3,7,8,9-HxCDF	29	147
¹³ C ₁₂ -2,3,4,6,7,8-HxCDF	28	136
¹³ C ₁₂ -1,2,3,4,6,7,8-HpCDF	28	143
¹³ C ₁₂ -1,2,3,4,7,8,9-HpCDF	26	138

Exova
#104, 19575-55 A Ave.
Surrey, BC
Canada, V3S 8P8

T: (604) 514-3322
F: (604) 514-3323
E: Surrey@exova.com
W: www.exova.com

11,30 am 14.3°C
27 sep 18 MC

Page 7 of 7

EXOVA



External Sublet Request

Lot: 1300986

Number of Samples: 3

Printed Date: Sep 27, 2018

Page 1 of 1

Sublet Requested to:

Attn: Patrick Pond
Pacific Rim Laboratories Inc.
103
19575 - 55A Avenue
Surrey, BC V3S 8P8
Tel: (604) 532-8711
Fax: (604) 532-8712

Exova Contact:

Questions can be directed to Exova Surrey
Client Services at (604) 514-3322.

Email Results to:

Surrey@exova.com

Mail Invoice to:

2395 Speakman Dr.,
Mississauga, ON L5K 1B3, Canada
E: accpayable.americas@exova.com

Due Date:

October 19, 2018

PO#: POC113407

The PO # Must be Recorded on all invoices.

Sample Id	Sample Date	Service	Service Name
✓ 1300986 - 1	Sep 26, 2018 PR182812	DFS	Dioxins and furans in soil
✓ 1300986 - 2	Sep 26, 2018 PR182813	DFS	Dioxins and furans in soil
✓ 1300986 - 3	Sep 26, 2018 PR182814	DFS	Dioxins and furans in soil

**If rush surcharge is required to meet due date, contact Exova prior to processing.

**Samples received are regular priority unless otherwise indicated on paperwork.

Special Instructions:

Relinquished by: _____

Received by: _____

Company: _____

Company: _____

Date: _____

Date: _____

Project Information

Project ID 2018447.01
Project Name DCMM18-01
Project Location Port Alberni
Legal Location
PO/AFE#
Proj. Acct. Code
Quote #

Invoice To:

Company TerraWest Environmental Inc.
Address 206, 2800 Bryn Maur Road
Victoria, BC V9B 3T4
Attention Accounts Payable
Phone 866-500-1553
Cell
Fax
E-mail kmarks@terrawest.ca
Agreement ID
Copy of Report

Report To:

Company TerraWest Environmental Inc.
Address 3148-F Barons Road, Nanaimo, BC
V9T 4B5
Attention Derek Nickel
Phone
Cell 1250216-4313
Fax
E-mail 1 dnickel@terrawest.ca
E-mail 2 ebell@terrawest.ca
Copy of Invoice

Report Results Regulatory Requirement

E-Mail	x	HCDWQG	
Mail		Ab Tier 1	
Online		SPIGEC	
Fax		BCCSR	x
PDF	x	Other (list below)	
Excel	x		
QA/QC	X		

Sample Custody (please print)

Sampled by: Derek Nickel
Company: TerraWest
I authorize Exova to proceed with the work indicated on this form:
Date: 26-20-2018 Initial: DN

This section for Lab use

Date/Time stamp:
SEP 27 '18 10:22

Indicate in the space allotted any deficiencies by the corresponding number.

RUSH Priority

☐ Emergency (contact lab for turnaround and pricing)
☐ Priority 1-2 working days (100% surcharge)
☐ Urgent 2-3 working days (50% surcharge)

When "ASAP" is requested, turn around will default to a 100% RUSH priority, with pricing and turn around time to match. Please contact the lab prior to submitting RUSH samples. If not all samples require RUSH, please indicate in the special instructions.

Date Required Signature

Special Instructions/Comments (please include contact information including ph. # if different from above).

Please report as per CSR Schedule 3.4 for Sediment samples

Site I.D.	Sample description	Depth start end in cm m	Date/Time sampled	Matrix	Sampling method	Number of Containers	CTEH10	BCCSR Metals in Sediment	Dioxins & Furans	PCP2	pH Soil	CTEH10W	W39BC	Hardness water	Enter tests above (✓ relevant samples below)	Indicate in the space allotted any deficiencies by the corresponding number.
1	SS18-01		9/26/2018	Sedim	Grab	7	✓	✓	✓	✓	✓					1. Indicate any samples that were not packaged well
2	SS18-02		9/26/2018	Sedim	Grab	7	✓	✓	✓	✓	✓					2. Indicate any samples not received in Exova supplies
3	SS18-03		9/26/2018	Sedim	Grab	7	✓	✓	✓	✓	✓					3. Indicate any samples that were not clearly labeled
4	SW18-01		9/26/2018	Water	Grab	7						✓	✓	✓		4. Indicate any samples not received within the required hold time or temp.
5	SW18-02		9/26/2018	Water	Grab	7						✓	✓	✓		5. Indicate any missing or extra samples
6	SW18-02A		9/26/2018	Water	Grab	1							✓	✓		6. Indicate any samples that were received broken
7	SW18-03		9/26/2018	Water	Grab	7						✓	✓	✓		7. Indicate any samples where sufficient volume was not received
8																8. Indicate any samples received in an inappropriate container
9																
10																
11																
12																
13																
14																
15																

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

Please indicate any potentially hazardous samples

Page 1 of 1

Control #

Indir

Lot: 1300986 COC



Shipping: COD Y/N

and size of coolers

Temp. received:

10.1

Delivery Method:

Waybill:

Received by: