# **November 19, 2017**

## Data\_17K0382

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
17K0382-01	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/27/2017	12/04/2017	SM 2340 B-97		Hardness	33.8		mg/L
17K0382-02	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/27/2017	12/04/2017	SM 2340 B-97		Hardness	37.1		mg/L
BFK0603-BLK1	Blank	13-05605-000	Water			11/21/2017	11/21/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0040	U	mg-P/L
BFK0603-BS1	LCS	13-05605-000	Water			11/21/2017	11/21/2017	SM 4500-P E-99		Orthophosphorus	0.149		mg-P/L
BFK0603-DUP1	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/21/2017	11/21/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0040	U	mg-P/L
BFK0603-MS1	WUFF-IN	13-05605-000		11/20/2017	11/20/2017	11/21/2017	11/21/2017	SM 4500-P E-99		Orthophosphorus	0.103		mg-P/L
17K0382-01	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/21/2017	11/21/2017	SM 4500-P E-99		Orthophosphorus	0.0040		mg-P/L
17K0382-02	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/21/2017	11/21/2017	SM 4500-P E-99		Orthophosphorus	0.0040	U	mg-P/L
BFK0682-BLK1	Blank	13-05605-000				11/27/2017	12/04/2017	EPA 6010C	7440-70-2	Calcium	0.0500	U	mg/L
BFK0682-BS1	LCS	13-05605-000	Water			11/27/2017	12/04/2017	EPA 6010C	7440-70-2	Calcium	9.46		mg/L
17K0382-01	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/27/2017	12/04/2017	EPA 6010C	7440-70-2	Calcium	10.3		mg/L
17K0382-02	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/27/2017	12/04/2017	EPA 6010C	7440-70-2	Calcium	11.1		mg/L
BFK0682-BLK1	Blank	13-05605-000	Water			11/27/2017	12/04/2017	EPA 6010C	7439-95-4	Magnesium	0.0500	U	mg/L
BFK0682-BS1	LCS	13-05605-000				11/27/2017	12/04/2017	EPA 6010C	7439-95-4	Magnesium	9.89		mg/L
17K0382-01	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/27/2017	12/04/2017	EPA 6010C	7439-95-4	Magnesium	1.98		mg/L
17K0382-02	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/27/2017	12/04/2017	EPA 6010C	7439-95-4	Magnesium	2.26		mg/L
BFK0704-BLK1	Blank	13-05605-000	Water			11/28/2017	11/28/2017	EPA 200.8	7440-50-8	Copper	0.500	U	ug/L
BFK0704-BS1	LCS	13-05605-000	Water			11/28/2017	11/28/2017	EPA 200.8	7440-50-8	Copper	27.0		ug/L
17K0382-01	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/28/2017	11/28/2017	EPA 200.8	7440-50-8	Copper	30.4		ug/L
17K0382-02	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/28/2017	11/28/2017	EPA 200.8	7440-50-8	Copper	28.2		ug/L
BFK0704-BLK1	Blank	13-05605-000	Water			11/28/2017	11/28/2017	EPA 200.8	7440-50-8	Copper	0.500	U	ug/L
BFK0704-BS1	LCS	13-05605-000	Water			11/28/2017	11/28/2017	EPA 200.8	7440-50-8	Copper	27.1		ug/L
BFK0704-BLK1	Blank	13-05605-000	Water			11/28/2017	11/28/2017	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BFK0704-BS1	LCS	13-05605-000	Water			11/28/2017	11/28/2017	EPA 200.8	7440-66-6	Zinc	85.3		ug/L
17K0382-01	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/28/2017	11/28/2017	EPA 200.8	7440-66-6	Zinc	93.9		ug/L
17K0382-02	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/28/2017	11/28/2017	EPA 200.8	7440-66-6	Zinc	94.6		ug/L
BFK0704-BLK1	Blank	13-05605-000	Water			11/28/2017	11/28/2017	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BFK0704-BS1	LCS	13-05605-000	Water			11/28/2017	11/28/2017	EPA 200.8	7440-66-6	Zinc	83.5		ug/L
BFK0714-BLK1	Blank	13-05605-000	Water			11/28/2017	12/01/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BFK0714-BLK2	Blank	13-05605-000	Water			11/28/2017	12/01/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BFK0714-BS1	LCS	13-05605-000	Water			11/28/2017	12/01/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.290		mg-P/L
BFK0714-BS2	LCS	13-05605-000	Water			11/28/2017	12/01/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.296		mg-P/L
BFK0714-DUP1	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/28/2017	12/01/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0820		mg-P/L
BFK0714-MS1	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/28/2017	12/01/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	2.10	D	mg-P/L
17K0382-01	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/28/2017	12/01/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0820		mg-P/L
17K0382-02	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/28/2017	12/01/2017	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0900		mg-P/L
BFK0767-BLK2	Blank	13-05605-000	Water			11/30/2017	12/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BFK0767-BS2	LCS	13-05605-000	Water			11/30/2017	12/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	26.2		ug/L
17K0382-03	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/30/2017	11/30/2017	EPA 200.8-Dissolved	7440-50-8	Copper	10.1		ug/L
17K0382-04	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/30/2017	11/30/2017	EPA 200.8-Dissolved	7440-50-8	Copper	10.5		ug/L
BFK0767-BLK2	Blank	13-05605-000	Water			11/30/2017	12/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BFK0767-BS2	LCS	13-05605-000	Water			11/30/2017	12/01/2017	EPA 200.8-Dissolved	7440-50-8	Copper	26.0		ug/L
BFK0767-BLK2	Blank	13-05605-000	Water			11/30/2017	12/01/2017	EPA 200.8-Dissolved		Zinc	4.00	U	ug/L
BFK0767-BS2	LCS	13-05605-000	Water			11/30/2017	12/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	80.4		ug/L
17K0382-03	WUFF-IN	13-05605-000	Water	11/20/2017	11/20/2017	11/30/2017	11/30/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	37.1		ug/L
17K0382-04	WUFF-OUT	13-05605-000	Water	11/20/2017	11/20/2017	11/30/2017	11/30/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	33.0		ug/L
BFK0767-BLK2	Blank	13-05605-000	Water			11/30/2017	12/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BFK0767-BS2	LCS	13-05605-000	Water			11/30/2017	12/01/2017	EPA 200.8-Dissolved	7440-66-6	Zinc	76.4		ug/L



27 December 2017

Dylan Ahearn Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

Associated SDG ID(s)

17K0382

# Amanda Volgardsen

Digitally signed by Amanda Volgardsen DN: c=US, st=Washington, I=Tukwila, o=Analytical Resources, Inc., ou=Client Services, cn=Amanda Volgardsen, email=amandav@arilabs.com

Date: 2017.12.27 14:56:12 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the regirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.



2200 Sixth Avenue | Suite 1100 Seattle, Washington | 98121 p 206 441 9080 | f 206 441 9108

## Chain of Custody Record

Project Name:	Projec	t Number:	Client:	Client:				Analyses Requested										
Hydro International Up-flo Filter	13-0	5605-000	Herrera Environmental				5		17									
Report To:			Copy To:				8	trati		M-39								
Dylan Ahearn							1254	cen	· sp	AST	5.3	5.3	40B	8.				
Sampled By:  MULLEN			Delivery Method	ind do	elle	ed	olids- SM	ent Cor	nded sol	bution -	- EPA 36	- EPA 36	3-SM 234	EPA 200	200.8	A 200.8	9.0	
Laboratory:		Requested Co	ompletion Date:	Total No.	of Contain	ners:	os p	din	sbe	Istri	rus	ırus	acc	- pa	EPA	H.	1 20	
Analytical Resources Inc.					2		apua	Se	e Su	ZeD	pho	spho	as C	solv	<u>=</u>	ved	EP/	
Lab Use:				Sample Type (see	Preser- vative?	Matrix (see	Total Suspended Solids- SM 2540D	spender SMD3977	Total volatile Suspended solids - SM2540-E	Particle-size Distribution - ASTM-3977	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	Hardness as CaCO3-SM 2340B	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved - EPA 200.8	Zinc, total - EPA 200.8	Lab ID No.
Sample ID		Date	Time	codes)	(Y/N)	codes)	٩		SM	ı			I			Zir		La
WUFF-IN		11-20,	17 1A:30	С	N	SW	х	Х	x	X	Χ	Х	Χ	Х	Х	Х	Х	
WUFF-OUT		11-20.1	7 14:30	С	N	SW	х	X	X	X	Х	X	X	X	Х	Х	Х	
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Comments/Special Instructions:		-							2			-						-
Send 1 liter to ETS, Inc 975 Trans	port Way, Suite 2, Pet	aluma, CA f	for PSD, TSS, a	nd TVSS.	PSD to	be run f	or >5(	00, 50	0-125	, 125-	62.5,	62.5-4	1, <4.					
Relinquished by (Name/CO/	Signature		Date/Time	Rei	ceived By	Name/CO	)		(	Signatur	e					Date/1	ime	
Myha Mulle/Herren	Mu Mil		11.20.17	- 17	ronnito	1100		Inn		3		-	7	1-	1	15		1/00
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remiquished by (Mame/CO/	Signature		Date/ Illie	Ver	cerved by	ivanie/ CO	1			Buatul	-							

Sample Type: G=Grab C=Composite

Matrix Codes: A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)





#### WORK ORDER

- TEAL TO SEE TO THE	
17K0382	
1/10382	

Client: Herrera Environmental Consultants

Project Manager: Amanda Volgardsen

Project: Hydro International

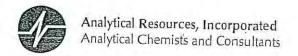
Project Number: 13-05605-000

#### **Preservation Confirmation**

Container ID	Container Type	рН
17K0382-01 A	Large OJ, 1000 mL	
17K0382-01 B	Large OJ, 1000 mL	
17K0382-01 C	Small OJ, 500 mL, 9N H2SO4	CZ Pall
17K0382-01 D	Small OJ, 500 mL	
17K0382-01 E	HDPE NM, 500 mL, 1:1 HNO3	(7- Dall
17K0382-02 A	Large OJ, 1000 mL	The state of the s
17K0382-02 B	Large OJ, 1000 mL	
17K0382-02 C	Small OJ, 500 mL, 9N H2SO4	(7, naxs
17K0382-02 D	Small OJ, 500 mL	
17K0382-02 E	HDPE NM, 500 mL, 1:1 HNO3	L Dass
17K0382-03 A	HDPE NM, 500 mL	2 fail
17K0382-04 A	HDPE NM, 500 mL	52 Paril

Preservation Confirmed By

Date



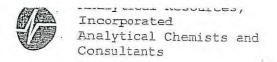
# Cooler Receipt Form

ARI Client:	01	Proiec	t Name:		
COC No(s):	NA NA		red by: Fed-Ex UPS Cor	urior Hand Day	
Assigned ARI Job No:	1K0382				
Preliminary Examination Pha	ase:	HECKII	ng No:		NA
Were intact, properly signed a	and dated custody seals attache	d to the outside o	of to cooler?		
	d with the cooler?			1	YES NO
	y filled out (ink, signed, etc.)			>	YES NO
Temperature of Cooler(s) (°C)	(recommended 2.0-6.0 °C for c	chemistry)	C13	C	YES NO
Tille.	compliance fill out form 00070F		017		
Cooler Accepted by:	17.17		no Alexander	Temp Gun ID:	#1002565
cooler Accepted by:	Complete	Date:	11/20/17 Tim	ie: 153	5
Log-In Phase:	Complete custody form	ns and attach al	I shipping documents		
				14	
Was a temperature blank inclu	uded in the cooler?				YES (NO
What kind of packing materi	ial was used? Bubble W	Irap Wet Ice Ge	Packs Baggies Foar	n Block Paper C	Other:ncin_e
was sumcientice used (if app	ropriate)?			NA	YES NO
Did all bottles arrive in good o	vidual plastic bags?				YES NO
Were all hottle labels complete	ondition (unbroken)?				YES NO
Did the number of containers I	e and legible?				YES NO
Did all bottle labels and tags a	listed on COC match with the nugree with custody papers?	imber of contains	ers received?		YES NO
Were all bottles used correct f	or the requested analyses?				YES NO
Do any of the analyses (bottle:	s) require preservation? (attach	nresentation cha	**************************************	16 12/5 4	YES NO
Were all VOC vials free of air I	bubbles?	preservation sile	et, excluding VOCs)	NA	(AE) NO
Was sufficient amount of samp	ole sent in each bottle?			NA	YES NO
Date VOC Trip Blank was mad	le at ARI			(1)	YES NO
Was Sample Split by ARI:		120/19		os old	Split by:
(	E	11/00	1)	10 in	Split by:
Samples Logged by:	Da Da	ate: 11/20	17 Time:_	1113	
	** Notify Project Mana	ger of discrepa	ncies or concerns **		
Comple ID - D-III					
Sample ID on Bottle	Sample ID on COC	Sam	ple ID on Bottle	Samp	le ID on COC
	3 3	-			
17	, I,	-1-	~		
Additional Notes, Discrepant	cies. & Resolutions				147
	a riscolatione.				8
4					
By:	Date:				
Small Air Bubbles Peabu		Small → "sm	" (<2 mm)		
-2mm 2-41	mm - >4mm	Peabubbles -	> "pb" (2 to < 4 mm)	i k	
	000	Large → "lg"	'(4 to < 6 mm)		
			The state of the s		

0016F 3/2/10

Cooler Receipt Form

Revision 014



# Cooler Temperature Compliance Form

Cooler#:Ten	nperature(°C):(	2.4
Sample ID	Bottle Count	Bottle Type
	A l	600
- Glimple's recieve	a anove	160
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Coalsett.		1 1 1 1 1
Cooler#: Tém	perature(°C):	
Sample ID	Bottle Count	Bottle Type
**	***	
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		No.
Cooler#: Tem	2070é.m. (°O\	
Sample ID	perature(°C):	I me con
	Bottle Count	Bottle Type
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Cooler#: Temo	erature(°C):	
Sample ID	Bottle Count	Bottle Type
		Dottie Type
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ompleted by:	,	1/201/-

0 O 070F

Cooler Temperature Compliance Form

Version 000° 3/3/09



# ETS

#### Environmental Technical Services

-Soil, Water & Air Testing & Monitoring -Analytical Labs

-Technical Support

975 Transport Way, Suite 2 Petaluma, CA 94954 (707) 778-9605/FAX 778-9612

e-mail: entech@pacbell.net

Serving people and the environment so that both benefit.

COMPANY: Analytical Resources, Inc., 4611 S. 134<sup>th</sup> Place, Suite 100, Tukwila, WA 98168

ATTN: Amanda Volgardsen

JOB: Hydro International Up-Flo Filter

SITE: Oregon-Washington

ANALYST(S)

DATE

DATE

COLLECTED RECEIVED COMPLETED

11/20/2017 11/22/2017 12/1/2017

ANALYST(S)

S. Santos

COLLECTED RECEIVED COMPLETED

11/20/2017 11/22/2017 12/1/2017

G.S. Conrad,PhD

SITE:	Oregon-Wa	shington			11/20/2017	11/22/2017	12/1/2017		G.S. Conrad,PhI
		PARTICLE	SIZE DISTRI	BUTION (PSD	)/TSS & TVS	S ANALYSIS	& REPORT		1
LAB SAMPLE NUMBER	SAMPLE ID	SOURCE of WATER	SUSPENDED SOLIDS mg/l @ ≥500 µ	SUSPENDED SOLIDS	SUSPENDED SOLIDS	SUSPENDED SOLIDS	SUSPENDED SOLIDS	SUSPENDED SOLIDS mg/l @ 1 µ	SUSPENDED SEDIMENT CONG TSS mg/l
07577-1	HI-43HEC/RW 17K03		#DIV/0!	#DIV/0!	#DIV/0!	Total SSC by	#DIV/0! / Summation →	#DIV/0! 0.0	44.6
07577-2	HI-44HEC/RW 17K03	WUFF-OUT 382-02	#DIV/0!	#DIV/0!	#DIV/0!	Total SSC by	#DIV/0! / Summation →	#DIV/0! 0.0	26.6
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! Total SSC by	#DIV/0! y Summation →	#DIV/0! 0.0	
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! Total SSC by	#DIV/0! y Summation →	#DIV/0! 0.0	
LAB SAMPLE NUMBER	SAMPLE	SOURCE of WATER	Water pH -log[H+]	ECw [Spec Cond] µS/cm	COLOR, TRUE PtCo Units	COLOR APPARENT PtCo Units	TOTAL IRON Fe (diss.) mg/l	SUSPENDE	VOLATILE O SOLIDS (TVSS) mg/l
07577-1	HI-43HEC/RW 17K03								25.6
07577-2	HI-44HEC/RW 17K03	WUFF-OUT 882-02							12.4

#### COMMENTS

The matrix has a very low concentration of TSS particles amounting to <50 ppm in the input sample; and the output sample is two-fifths that amount, i.e., for this pair of samples, the overall reduction in TSS is just over 40%. Because TVSS was done these data have been generated as well and show that roughly half of the total TSS is volatile which, of course, means that the other half is non-volatile, i.e., the fixed solids. The proportion that is volatile in the input sample is 57.4%, while this proportion drops in the output sample to 46.6%. Thus, it would appear proportionately more volatile than fixed solids are being removed by the filtration process, although perhaps this difference may arise from the very fact that by their very nature, some volatile solids simply dissipate during the removal/filtration process. In any case, input sample fixed soldis amount to right at 19.0 ppm; in the output sample fixed solids are porportionately higher and total 14.2 ppm.

\times \text{NOTES: Tests were done according to methodology as per Association of Testing Materials (ASTM): Suspended Sediment Concentration — Modified ASTM D3977 (Practice for Determining Suspended-Sediment Concentration in Water Samples). Standard Methods is followed for the other tests: Color - 2120 C; Spec Cond. (ECw) - 2510 B; Iron - 3500-Fe B; pH - 4500-H+ B; TRPH - 5520 C.

Page 6 of 27 17K0382 ARISample FINAL 27 Dec 2017 1454

# Materials Testing & Consulting, Inc.



Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Hydro International (17K0382)	Date Received:	November 28, 2017
Project #:	16T001-035	Sampled By:	Others
Client :	Analytical Resources, Inc.	Date Reported:	December 20, 2017
Source:	Multiple	Tested By:	B. Goble
MTC Sample#:	Multiple		

#### **CASE NARRATIVE**

<ol> <li>Two samples were submitted for sediment concentration by ASTM D3977, Method C.</li> <li>The coarse material was screened over a No. 230 sieve.</li> <li>The suspended solids are reported in mg/L.</li> <li>The data is provided in a summary table.</li> <li>There were no other noted anomalies in this project.</li> </ol>	

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

# Page 8 of 27 17K0382 ARISample FINAL 27 Dec 2017 1454

# Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

**Project:** Hydro International (17K0382) Project #: 16T001-035

Date Received: November 28, 2017

Date Tested: December 13, 2017

Client: Analytical Resources, Inc.

Sampled by: Others Tested by: B. Goble

#### Suspended Sediment Concentration ASTM D3977 Method C

Client Sample ID	MTC Sample ID	Sampling Date	Coarse Fraction SSC (>63µm) (mg/L)	FineFraction SSC (<63µm) (mg/L)	Total Suspended Sediment Concentration (mg/L)
WUFF-IN	T17-1690	11/20/2017	20.6	17.4	38.1
WUFF-OUT	T17-1691	11/20/2017	11.4	19.6	30.9

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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Herrera Environmental Consultants
Project: Hydro International

2200 6th Avenue, Suite 1100
Project Number: 13-05605-000
Reported:
Seattle WA, 98121
Project Manager: Dylan Ahearn
27-Dec-2017 14:54

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	17K0382-01	Water	20-Nov-2017 14:30	20-Nov-2017 15:35
WUFF-OUT	17K0382-02	Water	20-Nov-2017 14:30	20-Nov-2017 15:35
WUFF-IN	17K0382-03	Water	20-Nov-2017 14:30	20-Nov-2017 15:35
WUFF-OUT	17K0382-04	Water	20-Nov-2017 14:30	20-Nov-2017 15:35

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn27-Dec-2017 14:54

#### Case Narrative

#### Sample receipt

Samples as listed on the preceding page were received November 20, 2017 under ARI workorder 17K0382. For details regarding sample receipt, please refer to the Cooler Receipt Form. The samples were split by sample receiving prior to analysis. The TSS and TVSS analysis was subcontracted to ETS Labs. The SSC was subcontracted to MTC Labs.

#### **Total Hardness - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

#### Total and Dissolved Metals - EPA Method 200.8

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

#### Wet Chemistry (O-Phos, T-Phos)

The samples were prepared and analyzed within the recommended holding times.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recoveries and duplicate RPD were within QC limits.



Herrera Environmental Consultants Project: Hydro International

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 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
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#### WUFF-IN 17K0382-01 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 200.8
 Sampled: 11/20/2017 14:30

 Instrument: ICPMS2
 Analyzed: 28-Nov-2017 23:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BFK0704 Sample Size: 25 mL Prepared: 28-Nov-2017 Final Volume: 25 mL

Reporting Dilution Limit Units Analyte CAS Number Result Notes 7440-50-8 0.500 30.4 ug/L Copper Zinc 7440-66-6 1 4.00 93.9 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
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#### WUFF-IN 17K0382-01 (Water)

Metals and Metallic Compounds

 Method: EPA 6010C
 Sampled: 11/20/2017 14:30

 Instrument: ICP2
 Analyzed: 04-Dec-2017 20:30

Sample Preparation: Preparation Method: TWC EPA 3010A

Preparation Batch: BFK0682 Sample Size: 25 mL Prepared: 27-Nov-2017 Final Volume: 25 mL

Reporting CAS Number Dilution Limit Units Analyte Result Notes Calcium 7440-70-2 0.0500 10.3 mg/L Magnesium 7439-95-4 1 0.0500 1.98 mg/L

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Herrera Environmental Consultants

Project: Hydro International

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 Reported:

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 Project Manager: Dylan Ahearn
 27-Dec-2017 14:54

#### WUFF-IN 17K0382-01 (Water)

Wet		

Method: SM 4500-P E-99

Instrument: UV1800-2

Analyzed: 21-Nov-2017 12:36

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BFK0603 Sample Size: 50 mL Prepared: 21-Nov-2017 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0040 mg-P/L

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid

Preparation Batch: BFK0714 Sample Size: 25 mL Prepared: 28-Nov-2017 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0080 0.0820 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn27-Dec-2017 14:54

#### WUFF-IN 17K0382-01 (Water)

Calculation

 Method: SM 2340 B-97
 Sampled: 11/20/2017 14:30

 Instrument: [CALC]
 Analyzed: 04-Dec-2017 20:30

Sample Preparation: Preparation Method: [CALC]

Preparation Batch: [CALC]

Prepared: 27-Nov-2017 Final Volume: 1

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Hardness		1	0.331	33.8	mg/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn27-Dec-2017 14:54

#### WUFF-OUT 17K0382-02 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 200.8
 Sampled: 11/20/2017 14:30

 Instrument: ICPMS2
 Analyzed: 28-Nov-2017 23:29

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BFK0704 Sample Size: 25 mL

Prepared: 28-Nov-2017 Final Volume: 25 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Copper	7440-50-8	1	0.500	28.2	ug/L	
Zinc	7440-66-6	1	4.00	94.6	ug/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 27-Dec-2017 14:54

#### **WUFF-OUT** 17K0382-02 (Water)

Metals and Metallic Compounds

 Method: EPA 6010C
 Sampled: 11/20/2017 14:30

 Instrument: ICP2
 Analyzed: 04-Dec-2017 20:34

Sample Preparation: Preparation Method: TWC EPA 3010A

Preparation Batch: BFK0682 Sample Size: 25 mL Prepared: 27-Nov-2017 Final Volume: 25 mL

Reporting CAS Number Dilution Limit Units Analyte Result Notes Calcium 7440-70-2 0.0500 11.1 mg/L Magnesium 7439-95-4 1 0.0500 2.26 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn27-Dec-2017 14:54

#### WUFF-OUT 17K0382-02 (Water)

WW7 4		• 4
Wet	Che	emistry

Method: SM 4500-P E-99

Instrument: UV1800-2

Analyzed: 21-Nov-2017 12:38

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BFK0603 Sample Size: 50 mL Prepared: 21-Nov-2017 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 ND mg-P/L U

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid

Preparation Batch: BFK0714 Sample Size: 25 mL Prepared: 28-Nov-2017 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0080 0.0900 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100 Project Number: 13-05605-000 Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 27-Dec-2017 14:54

#### **WUFF-OUT** 17K0382-02 (Water)

Calculation

Method: SM 2340 B-97 Sampled: 11/20/2017 14:30 Instrument: [CALC] Analyzed: 04-Dec-2017 20:34

Sample Preparation: Preparation Method: [CALC] Preparation Batch: [CALC]

Prepared: 27-Nov-2017 Final Volume: 1

Reporting CAS Number Dilution Limit Units Analyte Result Notes Hardness 0.331 37.1 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 27-Dec-2017 14:54

#### WUFF-IN 17K0382-03 (Water)

Metals and Metallic Compounds (dissolved)

 Method: EPA 200.8
 Sampled: 11/20/2017 14:30

 Instrument: ICPMS2
 Analyzed: 30-Nov-2017 21:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BFK0767 Sample Size: 25 mL

Prepared: 30-Nov-2017 Final Volume: 25 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	10.1	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	37.1	ug/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

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 Project Number: 13-05605-000
 Reported:

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 Project Manager: Dylan Ahearn
 27-Dec-2017 14:54

#### **WUFF-OUT** 17K0382-04 (Water)

Metals and Metallic Compounds (dissolved)

 Method: EPA 200.8
 Sampled: 11/20/2017 14:30

 Instrument: ICPMS2
 Analyzed: 30-Nov-2017 21:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BFK0767 Sample Size: 25 mL

Prepared: 30-Nov-2017 Final Volume: 25 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	10.5	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	33.0	ug/L	

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Herrera Environmental Consultants

Project: Hydro International

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 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 27-Dec-2017 14:54

#### **Metals and Metallic Compounds - Quality Control**

#### Batch BFK0682 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0682-BLK1)			Prep	ared: 27-Nov	-2017 Ar	nalyzed: 04-	Dec-2017 1	7:47		
Calcium	ND	0.0500	mg/L							U
Magnesium	ND	0.0500	mg/L							U
LCS (BFK0682-BS1)			Prep	ared: 27-Nov	-2017 Ar	nalyzed: 04-	Dec-2017 1	8:24		
Calcium	9.46	0.0500	mg/L	10.0		94.6	80-120			
Magnesium	9.89	0.0500	mg/L	10.0		98.9	80-120			

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Herrera Environmental Consultants Project: Hydro International

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 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 27-Dec-2017 14:54

#### Metals and Metallic Compounds - Quality Control

#### Batch BFK0704 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0704-BLK1)				Prepa	ared: 28-Nov	7-2017 An	alyzed: 28-	Nov-2017 1	4:26		
Copper	63	ND	0.500	ug/L							U
Copper	65	ND	0.500	ug/L							U
Zinc	66	ND	4.00	ug/L							U
Zinc	67	ND	4.00	ug/L							U
LCS (BFK0704-BS1)				Prepa	ared: 28-Nov	7-2017 An	alyzed: 28-	Nov-2017 1	5:26		
Copper	63	27.0	0.500	ug/L	25.0		108	80-120			
Copper	65	27.1	0.500	ug/L	25.0		109	80-120			
Zinc	66	85.3	4.00	ug/L	80.0		107	80-120			
Zinc	67	83.5	4.00	ug/L	80.0		104	80-120			

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International Project Number: 13-05605-000 2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project Manager: Dylan Ahearn

Reported: 27-Dec-2017 14:54

#### Metals and Metallic Compounds (dissolved) - Quality Control

#### Batch BFK0767 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: CC

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0767-BLK2)				Prepa	ared: 30-Nov	-2017 An	alyzed: 01-	Dec-2017 1	7:55		
Copper, Dissolved	63	ND	0.500	ug/L							U
Copper, Dissolved	65	ND	0.500	ug/L							U
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
LCS (BFK0767-BS2)				Prepa	ared: 30-Nov	7-2017 Ana	alyzed: 01-	Dec-2017 1	8:34		
Copper, Dissolved	63	26.2	0.500	ug/L	25.0		105	80-120			
Copper, Dissolved	65	26.0	0.500	ug/L	25.0		104	80-120			
Zinc, Dissolved	66	80.4	4.00	ug/L	80.0		101	80-120			
Zinc, Dissolved	67	76.4	4.00	ug/L	80.0		95.5	80-120			

Analytical Resources, Inc.

Herrera Environmental Consultants

Project Number: 13-05605-000
Project Manager: Dylan Ahearn

2200 6th Avenue, Suite 1100 Seattle WA, 98121 **Reported:** 27-Dec-2017 14:54

#### **Wet Chemistry - Quality Control**

#### Batch BFK0603 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: GM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0603-BLK1)			Prepa	red: 21-Nov	7-2017 An	alyzed: 21	-Nov-2017 1	2:35		
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BFK0603-BS1)			Prepa	red: 21-Nov	/-2017 An	alyzed: 21	-Nov-2017 1	2:35		
Orthophosphorus	0.149	0.0040	mg-P/L	0.150		99.3	90-110			
Duplicate (BFK0603-DUP1)	Source:	17K0382-01	Prepa	red: 21-Nov	7-2017 An	alyzed: 21	-Nov-2017 1	2:37		
Orthophosphorus	ND	0.0040	mg-P/L		0.0040					U
Matrix Spike (BFK0603-MS1)	Source:	17K0382-01	Prepa	red: 21-Nov	7-2017 An	alyzed: 21	-Nov-2017 1	2:37		
Orthophosphorus	0.103	0.0040	mg-P/L	0.0999	0.0040	99.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100Project Number:13-05605-000Reported:Seattle WA, 98121Project Manager:Dylan Ahearn27-Dec-2017 14:54

#### **Wet Chemistry - Quality Control**

#### Batch BFK0714 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: RLM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0714-BLK1)							Dec-2017 1			110100
Total Phosphorus	ND	0.0080	mg-P/L	ircu. 20-110	V-2017 AII	aryzed. 01-	-DCC-2017 1	7.00		U
Blank (BFK0714-BLK2)			Prepa	red: 28-No	v-2017 An	alyzed: 01	Dec-2017 1	7:07		
Total Phosphorus	ND	0.0080	mg-P/L							U
LCS (BFK0714-BS1)			Prepa	red: 28-No	v-2017 An	alyzed: 01-	Dec-2017 1	7:01		
Total Phosphorus	0.290	0.0080	mg-P/L	0.300		96.7	90-110			
DL (BFK0714-BS2)			Prepa	red: 28-No	v-2017 An	alyzed: 01	Dec-2017 1	7:08		
Total Phosphorus	0.296	0.0080	mg-P/L	0.300		98.7	90-110			
Duplicate (BFK0714-DUP1)	Source:	17K0382-01	Prepa	red: 28-No	v-2017 An	alyzed: 01-	Dec-2017 1	7:03		
Total Phosphorus	0.0820	0.0080	mg-P/L		0.0820			0.00		
Matrix Spike (BFK0714-MS1)	Source:	17K0382-01	Prepa	red: 28-No	v-2017 An	alyzed: 01-	Dec-2017 1	7:03		
Total Phosphorus	2.10	0.0800	mg-P/L	2.00	0.0820	101	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International 2200 6th Avenue, Suite 1100 Project Number: 13-05605-000

Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 27-Dec-2017 14:54

#### **Certified Analyses included in this Report**

Analyte	Certifications

NELAP,WADOE,WA-DW,DoD-ELAP
NELAP,WADOE,WA-DW,DoD-ELAP

EPA 6010C in Water

WADOE, NELAP, DoD-ELAP Calcium Magnesium WADOE, NELAP, DoD-ELAP

SM 4500-P E-99 in Water

WADOE, NELAP Orthophosphorus Total Phosphorus WADOE, NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 27-Dec-2017 14:54

#### **Notes and Definitions**

U This analyte is not detected above the applicable reporting or detection limit.

J Estimated concentration value detected below the reporting limit.

D The reported value is from a dilution

B This analyte was detected in the method blank.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

[2C] Indicates this result was quantified on the second column on a dual column analysis.

# **November 21, 2017**

## Data\_17K0457

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
BFK0675-BLK1	Blank	13-05605-000	Water			11/27/2017	11/27/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	0.100	U	mg/L
BFK0675-BS1	LCS	13-05605-000	Water			11/27/2017	11/27/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	2.72		mg/L
17K0457-01	WUFF-IN	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	0.359		mg/L
17K0457-03	WUFF-IN QA	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	0.433		mg/L
17K0457-02	WUFF-OUT	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx		Diesel Range Organics (C12-C24)	0.424		mg/L
BFK0675-BLK1	Blank	13-05605-000	Water			11/27/2017	11/27/2017	NWTPH-Dx		Motor Oil Range Organics (C24-C38)	0.200	U	mg/L
17K0457-01	WUFF-IN	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx		Motor Oil Range Organics (C24-C38)	1.08		mg/L
17K0457-03	WUFF-IN QA	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx		Motor Oil Range Organics (C24-C38)	1.37		mg/L
17K0457-02	WUFF-OUT	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx		Motor Oil Range Organics (C24-C38)	1.24		mg/L
BFK0675-BLK1	Blank	13-05605-000	Water			11/27/2017	11/27/2017	NWTPH-Dx	84-15-1	o-Terphenyl	100		%
BFK0675-BS1	LCS	13-05605-000	Water			11/27/2017	11/27/2017	NWTPH-Dx	84-15-1	o-Terphenyl	99.0		%
17K0457-01	WUFF-IN	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx	84-15-1	o-Terphenyl	94.0		%
17K0457-03	WUFF-IN QA	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx	84-15-1	o-Terphenyl	90.8		%
17K0457-02	WUFF-OUT	13-05605-000	Water	11/21/2017	11/21/2017	11/27/2017	11/27/2017	NWTPH-Dx	84-15-1	o-Terphenyl	91.2		%



06 December 2017

Dylan Ahearn Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

Associated SDG ID(s)

17K0457

# **Amanda** Volgardsen | I=Tukwila, o=Anaiyticai Resources, Inc., ou=Client Services, cn=Amanda

Digitally signed by Amanda Volgardsen DN: c=US, st=Washington, Volgardsen, email=amandav@arilabs.com

Date: 2017.12.06 14:15:33 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the regirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

# Page 2 of 11 17K0457 ARISample FINAL 06 Dec 2017 1414

17K0457

### 2200 Sixth Avenue | Suite 1100 Seattle, Washington | 98121 p 206 441 9080 | f 206 441 9108

# **Chain of Custody Record**

PORTLAND, OR | MISSOULA, MT | OLYMPIA, WA WINTHROP, WA | GUANGZHOU, CHINA

Project Name:	Projec	t Number:	Client:								An	alyses f	Reques	sted			
Hydro International Up-flo Filter	13-0	5605-000	Herrera Environmental														
Report To:			Сору То:														
Dylan Ahearn														- 1			
Sampled By:  Mullen			Delivery Method		of were	1	Ş.										
Laboratory:		Requested Co	mpletion Date:	77.00	of Contain		ainer										
Analytical Resources Inc.					(0		Cont	- 55									
Lab Use:				Sample Type (see	Preserv- ative?	Matrix (see	Number of Containers	NWTPH-Dx									Lab ID No.
Sample ID		Date	Time	codes)	(Y/N)	codes)	N	Ž							lo-		Lab
WUFF-IN		11.21.17	13:00	G	N	SW	2	X						. 21			
WUFF-OUT		11.21.17	13:00	G	N	SW	2	Х									
WUFF-IN QA		11-21-17	9.7	G	N	SW	2	×									
10																	
Comments/Special Instructions:		× Areid	duplica	se													
Relinguished by (Name/CO/	Signature		Date/Time	Re	ceived By	(Name/CC	0)			Signatui	re				Date/	Time	
Relinguished by (Name/CO/ Meghan Mullen Herrera	meze Mu	el	Date/Time 11-21-17 14:00	13	rund ceived By	ON F	isk	141	RI	1	?	1	4	#EZ	11/2	21/17	1400
Relinquished by (Name/CO/	Signature		Date/Time	Po	caired Dr	Manalcr	11"	-	1	Signatur					Date/	Time	





# Cooler Receipt Form

ARI Client: Herrera	Project Name:		
COC No(s): NA	Delivered by: Fed-Ex UPS Cou	rief Hand Delive	Othor
Assigned ARI Job No: 17 KO457  Preliminary Examination Phase:	Tracking No:		NA
Were intact, properly signed and dated custody seals attached	d to the outside of to see L. C		
Were custody papers included with the cooler?	to the outside of to cooler?		YES NO
Were custody papers properly filled out (ink, signed, etc.)			YES NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for c	hamiatu A	(	YES NO
1006.	54		
If cooler temperature is out of compliance fill out form 00070F		Temp Gun ID#	2005206
Cooler Accepted by: 3	Date: 1/21/17 Time		2
Complete custody form	ns and attach all shipping documents	s	
Log-In Phase:			
Was a temperature blank included in the cooler?		210	
What kind of packing material was used? Bubble Wi	ran Waita Oth		YES NO
Was sufficient ice used (if appropriate)?	rap Wet Ice Gel Packs Baggies Foam	Block Paper Of	ther:
Were all bottles sealed in individual plastic bags?		NA	YES NO
Did all bottles arrive in good condition (unbroken)?			YES NO
Did all bottles arrive in good condition (unbroken)?			YES NO
Were all bottle labels complete and legible?			YES NO
Did the number of containers listed on COC match with the num	mber of containers received?		YES NO
Did all bottle labels and tags agree with custody papers?			YES NO
Were all bottles used correct for the requested analyses?			YES NO
Do any of the analyses (bottles) require preservation? (attach p	preservation sheet, excluding VOCs)	(NA)	YES NO
Were all VOC vials free of air bubbles?		(NA)	YES NO
Was sufficient amount of sample sent in each bottle?			YES) NO
Date VOC Trip Blank was made at ARI		NA	
Was Sample Split by ARI : NA YES Date/Time:	Equipment:		Split by:
Samples Logged by:Da	te: 11/22/19 Time:	1055	
** Notify Project Manag	ger of discrepancies or concerns **		
Sample ID on Bottle Sample ID on COC			
Sample ID on Bottle Sample ID on COC	Sample ID on Bottle	Sampl	e ID on COC
*			
	P -		
		1-1-	
Additional Notes, Discrepancies, & Resolutions:			
resolutions:			
4		-	
* **			
By: Date:			
Small Air Bubbles   Pesbubbles   LARGE to Bubbles	Small → "sm" (<2 mm)		
2-4 mm > 4 mm	Peabubbles -> "pb" (2 to < 4 mm)		
	Large > "lg" (4 to < 6 mm)		
	Headspace → "hs" (>6 mm)		
	1 o mm		

0016F 3/2/10

Cooler Receipt Form

Revision 014



Herrera Environmental Consultants Project: Hydro International

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 06-Dec-2017 14:14

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	17K0457-01	Water	21-Nov-2017 13:00	21-Nov-2017 14:00
WUFF-OUT	17K0457-02	Water	21-Nov-2017 13:00	21-Nov-2017 14:00
WUFF-IN QA	17K0457-03	Water	21-Nov-2017 13:00	21-Nov-2017 14:00

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn06-Dec-2017 14:14

### **Case Narrative**

### Sample receipt

Samples as listed on the preceding page were received November 21, 2017 under ARI workorder 17K0457. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The samples were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.



Herrera Environmental Consultants Project: Hydro International

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 06-Dec-2017 14:14

### WUFF-IN 17K0457-01 (Water)

**Petroleum Hydrocarbons** 

 Method: NWTPH-Dx
 Sampled: 11/21/2017 13:00

 Instrument: FID3
 Analyzed: 27-Nov-2017 16:13

Sample Preparation: Preparation Method: EPA 3510C SepF

Preparation Batch: BFK0675 Sample Size: 440 mL Prepared: 27-Nov-2017 Final Volume: 1 mL

	·	·	Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.114	0.359	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)		1	0.227	1.08	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	94.0	%	

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International
2200 6th Avenue, Suite 1100

Project Number: 13-05605-000

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 06-Dec-2017 14:14

### WUFF-OUT 17K0457-02 (Water)

**Petroleum Hydrocarbons** 

 Method: NWTPH-Dx
 Sampled: 11/21/2017 13:00

 Instrument: FID3
 Analyzed: 27-Nov-2017 16:29

Sample Preparation: Preparation Method: EPA 3510C SepF

Preparation Batch: BFK0675 Sample Size: 450 mL Prepared: 27-Nov-2017 Final Volume: 1 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.111	0.424	mg/L	
HC ID: DRO Motor Oil Range Organics (C24-C38)		1	0.222	1.24	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	91.2	%	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn06-Dec-2017 14:14

### WUFF-IN QA 17K0457-03 (Water)

**Petroleum Hydrocarbons** 

 Method: NWTPH-Dx
 Sampled: 11/21/2017 13:00

 Instrument: FID3
 Analyzed: 27-Nov-2017 16:45

Sample Preparation: Preparation Method: EPA 3510C SepF

Preparation Batch: BFK0675 Sample Size: 445 mL Prepared: 27-Nov-2017 Final Volume: 1 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)		1	0.112	0.433	mg/L	
HC ID: DRO Motor Oil Range Organics (C24-C38)		1	0.225	1.37	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	90.8	%	

Analytical Resources, Inc.

Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number:13-05605-000Reported:Seattle WA, 98121Project Manager:Dylan Ahearn06-Dec-2017 14:14

### **Petroleum Hydrocarbons - Quality Control**

### Batch BFK0675 - EPA 3510C SepF

Instrument: FID3 Analyst: ML

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BFK0675-BLK1)			Prepa	ared: 27-Nov	-2017 Ar	alyzed: 27-	Nov-2017 1	4:52		
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
Surrogate: o-Terphenyl	0.451		mg/L	0.450		100	50-150			
LCS (BFK0675-BS1)			Prepa	ared: 27-Nov	-2017 Ar	nalyzed: 27-	Nov-2017 1	5:08		
Diesel Range Organics (C12-C24)	2.72	0.100	mg/L	3.00		90.6	56-120			
Surrogate: o-Terphenyl	0.446		mg/L	0.450		99.0	50-150			

Analytical Resources, Inc.



Herrera Environmental Consultants
Project: Hydro International
2200 6th Avenue, Suite 1100
Project Number: 13-05605-000
Seattle WA, 98121
Project Manager: Dylan Ahearn

**Reported:** 06-Dec-2017 14:14

### **Certified Analyses included in this Report**

Analyte	Certifications

NWTPH-Dx in Water	
Diesel Range Organics (C12-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C38)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP,NELAP,WADOE
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 06-Dec-2017 14:14

### **Notes and Definitions**

U This analyte is not detected above the applicable reporting or detection limit.

D The reported value is from a dilution

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

[2C] Indicates this result was quantified on the second column on a dual column analysis.

# **December 28, 2017**

## Data\_17L0472

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
BFL0670-BLK1	Blank	13-05605-000	Water			12/30/2017	12/30/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0040	U	mg-P/L
BFL0670-BS1	LCS	13-05605-000	Water			12/30/2017	12/30/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.150		mg-P/L
BFL0670-DUP1	WUFF-IN		Surface Water	12/29/2017	12/29/2017	12/30/2017	12/30/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0090	*, L	mg-P/L
BFL0670-MS1	WUFF-IN	13-05605-000	Surface Water	12/29/2017	12/29/2017	12/30/2017	12/30/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.105		mg-P/L
17L0472-01	WUFF-IN		Surface Water	12/29/2017	12/29/2017	12/30/2017	12/30/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0170		mg-P/L
17L0472-02	WUFF-OUT	13-05605-000	Surface Water	12/29/2017	12/29/2017	12/30/2017	12/30/2017	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0110		mg-P/L
BGA0130-BLK1	Blank	13-05605-000	Water			01/05/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0220	*	mg-P/L
BGA0130-BLK2	Blank	13-05605-000	Water			01/05/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0220	*	mg-P/L
BGA0130-BLK3	Blank	13-05605-000	Water			01/05/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0220	*	mg-P/L
BGA0130-BS1	LCS	13-05605-000	Water			01/05/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.328	В	mg-P/L
BGA0130-BS2	LCS	13-05605-000	Water			01/05/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.330	В	mg-P/L
BGA0130-BS4	LCS	13-05605-000	Water			01/05/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.328	В	mg-P/L
17L0472-01	WUFF-IN	13-05605-000	Surface Water	12/29/2017	12/29/2017	01/05/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.142	В	mg-P/L
BGA0136-BLK1	Blank	13-05605-000	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0136-BLK2	Blank	13-05605-000	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0136-BLK4	Blank	13-05605-000	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0136-BS1	LCS	13-05605-000	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.306		mg-P/L
BGA0136-BS2	LCS	13-05605-000				01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.304		mg-P/L
BGA0136-BS3	LCS	13-05605-000	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.304		mg-P/L
17L0472-02	WUFF-OUT	13-05605-000	Surface Water	12/29/2017	12/29/2017	01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0700		mg-P/L



24 January 2018

Dylan Ahearn Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

Associated SDG ID(s)

17L0472

# Amanda Volgardsen Resources, Inc., ou=Client

Digitally signed by Amanda Volgardsen DN: c=US, st=Washington, Volgardsen, email=amandav@arilabs.com Date: 2018.01.24 16:45:19 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the regirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it

Accreditation # 66169

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202

# Page 2 of 16 17L0472 ARISample FINAL 24 Jan 2018 1635

2200 Sixth Avenue | Suite 1100 Seattle, Washington | 98121 p 206 441 9080 | f 206 441 9108

# **Chain of Custody Record**

Project Name:	Project Number:	Client:								An	alyses	Reques	ted				
Hydro International Up-flo Filter	13-05605-000	Herrera Env	ironment	al			5		12								
Report To:			Сору То:			9	trati		M 39				,				
Dylan Ahearn						2540D	cen	sp.	AST	5.3	10 60	1	80				
Sampled By: Dylan Ahearn		Delivery Metho	od:			lids-SM	ent Con	los papu	bution -	- EPA 36	- EPA 36	603:5W2340B	EP.4-20	200.8	A 200:8	8.6	
Laboratory:	Requested (	Completion Date:	Total No.	of Contain	ners:	d Sc	Ë	spel	stri	rus	rus	9	1	₩ d	4	FA 260.8	
Analytical Resources Inc.	\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	2/18		2		ande	Se	e Su	Ze D	oyds	spho		4	1	100	1	
Lab Use:			Sample Type (see	Preser- vative?	Matrix (see	Total Suspended Solids-	spende	Total volatile Suspended solids - SM2540-E	Particle size Distribution - ASTM 3977	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	ardness	Gepper, dissulved	Copper tetal EPA 200.8	Zine, dissolved - EPA 200:8		Lab ID No.
Sample ID	Date	Time	codes)	(Y/N)	codes)	P	Su Su	S T	Δ.	۴		<b>#</b>	8	8	#	1	E a
WUFF-IN	12/24/1.	7 11:12	C	N	SW	×	Х	x	X	Х	X	X	X	X	*	X	
WUFF-OUT	15/24/1	7 11:12	С	N	SW	х	Х	Х	Х	Х	X	, k	X,	Х	X	X	
	1 11																
The second secon																	
war and the management of the same of the						ļ											
						L	ļ										
Comments/Special Instructions:						3-/c	300	. O MV.						-			
Send 1 liter to ETS, Inc 975 Transport Way, Sui	ite 2, Petaluma, CA	for PSD, TSS,	and TVSS.	PSD to	be run f	for >5	00, 50	0-125	5, 125-	62.5,	62.5-	4, <4.					2
Relinquished by (Name/CO/ Signature )	1.	Date/Time	7 12:56	ceived By	N	_			Signatui 1400	nov	Mie	, Fi	ζ <sub>ν</sub>	ч	Date/1	9/1	7
Relinquished by (Name/CO/ Signature		Date/Time	Re	ceived By	(Name/CC	0)			Signatu	re					Date/1	ime	
Sample Type: G=Grab	ix Codes: A=Air GW=	Groundwater S	F=Sediment	SO=Sni	SW=Su	rface V	Vater	W=W:	ater (bla	nks) P	vi=Mat	erial (	0=Oth	er (sper	ifv)		

da Hydro upflo COC Composite Sample.docx

**HERRERA** 

Project Name

Printed: 12/29/2017 1:57:35PM

### WORK ORDER

17L0472

Project Number: 13-05605-000

Client: Herrera Environmental Consultants Project Manager: Amanda Volgardsen **Project: Hydro International** 

**Analysis** Due **TAT Expires** Comments

### **Environmental Technical Services**

17L0472-02 WUFF-OUT | Water | Sampled 29-Dec-2017 11:12 (GMT-08:00)

Pacific Time (US & Canada)

Solids, Total Volatile Suspended SM 25-15-Jan-2018 15:00 10 05-Jan-2018 11:12 Solids, Total Suspended SM 2540 D-97 15-Jan-2018 15:00 10 05-Jan-2018 11:12 PSD (Particle Size Distribution by Laser 15-Jan-2018 15:00 10 05-Jan-2018 11:12

### Materials Testing & Consulting, Inc.

17L0472-01 WUFF-IN [Water] Sampled 29-Dec-2017 11:12 (GMT-08:00)

Pacific Time (US & Canada)

Suspended Sed Conc ASTM D3977 (Su 15-Jan-2018 15:00

10 05-Jan-2018 11:12

17L0472-02 WUFF-OUT [Water] Sampled 29-Dec-2017 11:12 (GMT-08:00)

Pacific Time (US & Canada)

Suspended Sed Conc ASTM D3977 (Su 15-Jan-2018 15:00

05-Jan-2018 11:12

### **Preservation Confirmation**

Container ID	Container Type	рН
17L0472-01 A	Large OJ, 1000 mL	
17L0472-01 B	Large OJ, 1000 mL	
17L0472-01 C	Large OJ, 1000 mL	
17L0472-01 D	Small OJ, 500 mL, 9N H2SO4	L7_ Dall
17L0472-01 E	Small OJ, 500 mL	
17L0472-02 A	Large OJ, 1000 mL	
17L0472-02 B	Large OJ, 1000 mL	
17L0472-02 C	Large OJ, 1000 mL	
17L0472-02 D	Small OJ, 500 mL, 9N H2SO4	(7 Dass
17L0472-02 E	Small OJ, 500 mL	

Preservation Confirmed By

Analytical Chemists and Consultants	Cooler Receipt Form
ARI Client: HCLVAVA  COC No(s): NA  Assigned ARI Job No: 17LO+7L  Preliminary Examination Phase:  Were intact, properly signed and dated custody seals attached	Project Name:
Were custody papers included with the cooler?	YES NO
Was a temperature blank included in the cooler?  What kind of packing material was used? Bubble Wraterial was sufficient ice used (if appropriate)?  Were all bottles sealed in individual plastic bags?  Did all bottles arrive in good condition (unbroken)?  Were all bottle labels complete and legible?  Did the number of containers listed on COC match with the number of all bottle labels and tags agree with custody papers?  Were all bottles used correct for the requested analyses?  Do any of the analyses (bottles) require preservation? (attach provided and the complete sent in each bottle?  Was sufficient amount of sample sent in each bottle?  Date VOC Trip Blank was made at ARI  Was Sample Split by ARI: NA ES Date/Time: 12	Ap Wat Ice Gel Packs Baggies Foam Block Paper Other:  NA (FS) NO  YES NO  YES NO  The reservation sheet, excluding VOCs)  NA (FS) NO  YES NO  NA (FS) NO  NA (FS) NO  NA (FS) NO  NA (FS) NO  YES NO  NA (FS) NO  YES NO  NA (FS) NO  YES NO
Sample ID on Bottle Sample ID on COC	Sample ID on Bottle Sample ID on COC
Additional Notes, Discrepancies, & Resolutions:  NO SCUMP W + M C  By: Date: 1/2/11  Small Air Bubbles Pestubbles LARGE Air Bubbles > 4 mm  5 6 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	Small > "sm" (<2 mm) Peabubbles > "pb" (2 to <4 mm)

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Cooler Receipt Form

Large > "lg" (4 to < 6 mm)

Headspace > "hs" (> 6 mm)

Revision 014



# ETS

### Environmental Technical Services

-Soil, Water & Air Testing & Monitoring

-Analytical Labs

-Technical Support

975 Transport Way, Suite 2
Petaluma, CA 94954
(707) 778-9605/FAX 778-9612
e-mail: entech@pacbell.net

Serving people and the environment so that both benefit.

PERVISOR
Jacobson
DIRECTOR
Conrad,Ph

		3			12.12012011	17072010	1/10/2010		G.S. Conrad, Pin
	DA	DTIOL E. OLT					•		
1.40				ON (PSD), TS	The state of the s	The second second second second	The second secon		
LAB	SAMPLE	SOURCE	SUSPENDED						SUSPENDED
SAMPLE		of	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SEDIMENT CON
NUMBER	ID	WATER	mg/I @ ≥500 μ	mg/l @ 125 μ	mg/l @ 63 μ	mg/l @ 32 μ	mg/l @ 4 μ	mg/l @ 1 μ	TSS mg/l
07607-1	HI-45HEC/RW	WUFF-IN	0.5	1.0	1.5		8.9	7.7	20.0
	17L04		2.6%	5.1%	7.7%		45.4%	39.3%	20.0
						Total SSC by	Summation →		
07607-2	HI-45HEC/RW	<b>WUFF-OUT</b>	0.0	0.0	0.5		3.4	2.3	5.0
	17L04	72-02	0.0%	0.0%	8.1%		54.8%	37.1%	0.0
			K			Total SSC by	Summation →		
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
						Total SSC by	Summation →	0.0	
		4			0.00				
		111	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
						Total SSC by	Summation →	0.0	
LAB	SAMPLE	SOURCE	Water pH	ECw	COLOR,	COLOR	TOTAL IRON	TOTAL	VOLATILE
SAMPLE		of		[Spec Cond]	TRUE	APPARENT	Fe (diss.)		SOLIDS (TVSS)
NUMBER	ID	WATER	-log[H+]	μS/cm	PtCo Units	PtCo Units	mg/l		mg/l
07607-1	LIL AELIEC/DIM	MALIEE IN							
07007-1	HI-45HEC/RW 17L04								17.0
	17204	72-01							
07607-2	HI-45HEC/RW	WUFF-OUT					9		3.0
	17L04								3.0
							i i		
100000									

### COMMENTS

The matrix has a very low concentration of TSS particles amounting to ~20 ppm in the input sample; and the output sample is about a quarter of that amount. The overall average reduction in TSS is >71%. The reductions in each fraction are very substantial as follows: 100%, 100%, 66.7%, 61.8%, and 70.1%. Because TVSS data were generated the amount of volatiles is known and calculates to be at about 86% (85.0%-86.7%) in the input sample; and at >54% in the output sample. Because there is proportionately more variation in the TSS results for the output sample, the calcuated TVSS range is greater at 48.4% -60.0%. But then TSS values are so low it doesn't take very much absolute difference to increase any given parameter range. In any case, most of input particulate matter is organic (i.e., volatile) with only about 15% being mineral (or other non-volatile). This declines some in the output smaple indicating that proportionately a little more volatile was remove that non-volatile. The RPDs are excellent to good (borderline very good) as follows: ±1.0%; and ±10.7%.

NOTES: Tests were done according to methodology as per Association of Testing Materials (ASTM): Suspended Sediment Concentration — Modified ASTM D3977 (Practice for Determining Suspended-Sediment Concentration in Water Samples). Standard Methods is followed for the other tests: Color - 2120 C; Spec Cond. (ECw) - 2510 B; Iron - 3500-Fe B; pH - 4500-H+ B: TRPH - 5520 C.

Page 5 of 16 17L0472 ARISample FINAL 24 Jan 2018 1635

# Materials Testing & Consulting, Inc. Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting



Project: Hydro International (17L0472)	Date Received: January 5, 2018
Project #: 16T001-035	Sampled By: Others
Client: Analytical Resources, Inc.	Date Reported: January 24, 2018
Source: Multiple	Tested By: B. Goble
MTC Sample#: Multiple	

### **CASE NARRATIVE**

<ol> <li>Two samples were submitted for sediments.</li> <li>The coarse material was screened over an account of the suspended solids are reported in magnetic forms.</li> <li>The data is provided in a summary table of the series of the suspended solids are reported in magnetic forms.</li> <li>There were no other noted anomalies in the summary table of the series of the summary table.</li> </ol>	a No. 230 sieve. g/L. e.	ASTM D3977, M	ethod C.

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval

Reviewed by:	Egahitable	12	<u> </u>
•			

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Regional Offices: Olympia ~ 360.534.9777 Bellingham ~ 360.647.6111

Silverdale ~ 360.698.6787

Tukwila ~ 206.241.1974

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# Page 7 of 16 17L0472 ARISample FINAL 24 Jan 2018 1635

# Materials Testing & Consulting, Inc.





Project: Hydro International (17L0472)	Client: Analytical
Project #: 16T001-035	
Date Received: January 5, 2018	Sampled by: Others
Date Tested: January 19, 2018	Tested by: B. Goble

### Suspended Sediment Concentration ASTM D3977 Method C

Client Sample ID	MTC Sample ID	Sampling Date	Coarse Fraction SSC (>63µm) (mg/L)	FineFraction SSC (<63µm) (mg/L)	Total Suspended Sediment Concentration (mg/L)
WUFF-IN	S18-0009	12/29/2017	6.0	26.0	32.1
WUFF-OUT	S18-0009	12/29/2017	1.4	14.5	16.0

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Regional Offices: Olympia ~ 360.534.9777

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Resources, Inc.

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Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100

Seattle WA, 98121

Project Number: 13-05605-000 Project Manager: Dylan Ahearn

Reported: 24-Jan-2018 16:35

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory 1D	Matrix	Date Sampled	Date Received
WUFF-IN	17L0472-01	Water	29-Dec-2017 11:12	29-Dec-2017 12:56
WUFF-OUT	17L0472-02	Water	29-Dec-2017 11:12	29-Dec-2017 12:56



Herrera Environmental Consultants

2200 6th Avenue, Suite 1100

Project: Hydro International

Project Number: 13-05605-000 Project Manager: Dylan Ahearn **Reported:** 24-Jan-2018 16:35

### **Case Narrative**

### Sample receipt

Seattle WA, 98121

Samples as listed on the preceding page were received December 29, 2017 under ARI workorder 17L0472. For details regarding sample receipt, please refer to the Cooler Receipt Form. The samples were split by sample receiving prior to analysis. The PSD, TSS and TVSS analysis was subcontracted to ETS Labs. The SSC analysis was subcontracted to MTC.

### Wet Chemistry (O-Phos, T-Phos)

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The T-Phos method blank has detections above the reporting limits. Associated samples and QC have been flagged with an "B" qualifier. The analysis was reanalyzed with all QC within control limits. No further corrective action was taken.

The LCS percent recoveries were within control limits.

An O-Phos matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recovery was within QC limits. The duplicate has an O-Phos concentration <=5 times the reporting limit, and the replicate control limit defaults to +/- the reporting limit instead of 20% of the RPD. The duplicate has been flagged with an "L" qualifier. The results are advisory. No further corrective action was taken.



Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project Number: 13-05605-000 Project Manager: Dylan Ahearn **Reported:** 24-Jan-2018 16:35

WUFF-IN 17L0472-01 (Water)

Wet Chemistry

Sample Preparation:

Method: SM 4500-P E-99 Instrument: UV1800-2 Sampled: 12/29/2017 11:12 Analyzed: 30-Dec-2017 15:46

Preparation Method: No Prep Wet Chem

Preparation Batch: BFL0670 Prepared: 30-Dec-2017 Sample Size: 50 mL Final Volume: 50 mL

| Reporting | | Analyte | CAS Number | Dilution | Limit | Result | Units | Notes | Notes | CAS Number | Dilution | Limit | Result | Units | Notes | Notes | CAS Number | Dilution | Limit | Result | Units | Notes | N

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid

Preparation Batch: BGA0130 Prepared: 05-Jan-2018 Sample Size: 25 mL Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0160 0.1420 mg-P/L B

Analytical Resources, Inc.



Herrera Environmental Consultants

2200 6th Avenue, Suite 1100 Seattle WA, 98121

Project: Hydro International

Project Number: 13-05605-000 Project Manager: Dylan Ahearn

Reported: 24-Jan-2018 16:35

**WUFF-OUT** 17L0472-02 (Water)

Wet Chemistry

Sample Preparation:

Method: SM 4500-P E-99 Instrument: UV1800-2

Sampled: 12/29/2017 11:12 Analyzed: 30-Dec-2017 15:48

Preparation Method: No Prep Wet Chem

Preparation Batch: BFL0670

Sample Size: 50 mL

Prepared: 30-Dec-2017

Final Volume: 50 mL

Reporting Limit Units Notes Analyte CAS Number Dilution Result 1426-54-42 0.0040 0.0110 mg-P/L 1 Orthophosphorus

Sample Preparation:

Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0136 Prepared: 06-Jan-2018

Sample Size: 25 mL Final Volume: 50 mL

Reporting Limit CAS Number Dilution Units Notes Analyte Result 7723-14-0 0.0080 0.0700 mg-P/L Total Phosphorus 1

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project Number: 13-05605-000 Project Manager: Dylan Ahearn **Reported:** 24-Jan-2018 16:35

### **Wet Chemistry - Quality Control**

### Batch BFL0670 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: KK

		Reporting		Spike	Source		%REC	11 11	RPD	
QC Sample/Analyte	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Blank (BFL0670-BLK1)	-		Prepa	ared: 30-Dec	:-2017 An:	alyzed: 30-	Dec-2017 1	5:45	шП	
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BFL0670-BS1)			Prepa	ared: 30-Dec	:-2017 An	alyzed: 30-	Dec-2017 1	5:46		
Orthophosphorus	0.150	0.0040	mg-P/L	0.150		100	90-110			
Duplicate (BFL0670-DUP1)	Source:	17L0472-01	Prepa	ared: 30-Dec	:-2017 An	alyzed: 30-	Dec-2017 1	5:46		
Orthophosphorus	0.0090	0.0040	mg-P/L		0.0170			61.50	20	*, L
Matrix Spike (BFL0670-MS1)	Source:	17L0472-01	Prepa	ared: 30-Dec	:-2017 An	alyzed: 30-	Dec-2017 1	5:47		
Orthophosphorus	0.105	0.0040	mg-P/L	0.0999	0.0170	88.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project: Hydro International Project Number: 13-05605-000 Project Manager: Dylan Ahearn

**Reported:** 24-Jan-2018 16:35

### **Wet Chemistry - Quality Control**

### Batch BGA0130 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0130-BLK1)			Prepa	ared: 05-Jan-	-2018 Ana	alyzed: 06-J	an-2018 17:	17		
Total Phosphorus	0.0220	0.0160	mg-P/L							*
Blank (BGA0130-BLK2)			Prepa	ared: 05-Jan-	-2018 Ana	alyzed: 06-J	an-2018 17:	39		
Total Phosphorus	0.0220	0.0160	mg-P/L							*
Blank (BGA0130-BLK3)			Prepa	ared: 05-Jan-	-2018 Ana	alyzed: 06-J	an-2018 17:	43		
Total Phosphorus	0.0220	0.0160	mg-P/L							*
LCS (BGA0130-BS1)			Prepa	ared: 05-Jan-	-2018 Ana	alyzed: 06-J	an-2018 17:	18		
Total Phosphorus	0.328	0.0160	mg-P/L	0.300		109	90-110			В
LCS (BGA0130-BS2)			Prepa	ared: 05-Jan-	-2018 Ana	alyzed: 06-J	an-2018 17:	40		
Total Phosphorus	0.330	0.0160	mg-P/L	0.300		110	90-110			В
LCS (BGA0130-BS4)			Prepa	ared: 05-Jan-	-2018 Ana	alyzed: 06-J	an-2018 17:	45		
Total Phosphorus	0.328	0.0160	mg-P/L	0.300		109	90-110			В

Analytical Resources, Inc.





Herrera Environmental Consultants

2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project: Hydro International

Project Number: 13-05605-000 Project Manager: Dylan Ahearn Reported:

24-Jan-2018 16:35

### Wet Chemistry - Quality Control

### Batch BGA0136 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0136-BLK1)		_	Prepa	red: 06-Jan	-2018 Ana	lyzed: 06-J	an-2018 16:	:41		·
Total Phosphorus	ND	0.0080	mg-P/L							U
Blank (BGA0136-BLK2)	_		Prepa	red: 06-Jan-	-2018 Ana	lyzed: 06-J	an-2018 16:	:45		
Total Phosphorus	ND	0.0080	mg-P/L							U
Blank (BGA0136-BLK4)			Prepa	red: 06-Jan	-2018 Ana	lyzed: 06-J	an-2018 16:	:47		
Total Phosphorus	ND	0.0080	mg-P/L	_						U
LCS (BGA0136-BS1)			Prepa	red: 06-Jan	-2018 Ana	lyzed: 06-J	an-2018 16:	:41		
Total Phosphorus	0.306	0.0080	mg-P/L	0.300		102	90-110			
LCS (BGA0136-BS2)			Prepa	ıred: 06-Jan	-2018 Ana	lyzed: 06-J	an-2018 16:	:46		
Total Phosphorus	0.304	0.0080	mg-P/L	0.300		101	90-110			
LCS (BGA0136-BS3)			Prepa	ared: 06-Jan	-2018 Ana	lyzed: 06-J	an-2018 16	:48		
Total Phosphorus	0.304	0.0080	mg-P/L	0.300		101	90-110			

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100

Seattle WA, 98121

Project Number: 13-05605-000 Project Manager: Dylan Ahearn Reported: 24-Jan-2018 16:35

### **Certified Analyses included in this Report**

Analyte Certifications

SM 4500-P E-99 in Water

Orthophosphorus
Total Phosphorus

WADOE, NELAP WADOE, NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018



Herrera Environmental Consultants
Project: Hydro International
2200 6th Avenue, Suite 1100
Project Number: 13-05605-000

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:35

### **Notes and Definitions**

U This analyte is not	detected above the applicable	reporting or detection limit.
-----------------------	-------------------------------	-------------------------------

L Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to +/- RL instead of 20% RPD

B This analyte was detected in the method blank.

Flagged value is not within established control limits.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

[2C] Indicates this result was quantified on the second column on a dual column analysis.

# **January 4, 2018**

## Data\_18A0070

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
18A0070-01	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/08/2018	SM 2340 B-97		Hardness	49.5		mg/L
18A0070-03	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/08/2018	SM 2340 B-97		Hardness	59.9		mg/L
BGA0135-BLK1	Blank	Hydro International	Water			01/05/2018	01/05/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0040	U	mg-P/L
BGA0135-BS1	LCS	Hydro International	Water			01/05/2018	01/05/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.152		mg-P/L
BGA0135-DUP1	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/05/2018	01/05/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0130		mg-P/L
BGA0135-MS1	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/05/2018	01/05/2018	SM 4500-P E-99		Orthophosphorus	0.110		mg-P/L
18A0070-01	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/05/2018	01/05/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0120		mg-P/L
18A0070-03	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/05/2018	01/05/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0120		mg-P/L
BGA0136-BLK1	Blank	Hydro International	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0136-BLK2	Blank	Hydro International	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0136-BLK4	Blank	Hydro International	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0136-BS1	LCS	Hydro International	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.306		mg-P/L
BGA0136-BS2	LCS	Hydro International	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.304		mg-P/L
BGA0136-BS3	LCS	Hydro International	Water			01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.304		mg-P/L
18A0070-01	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.122		mg-P/L
18A0070-03	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/06/2018	01/06/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0480		mg-P/L
BGA0139-BLK1	Blank	Hydro International	Water			01/08/2018	01/09/2018	EPA 200.8	7440-50-8	Copper	0.500	U	ug/L
BGA0139-BS1	LCS	Hydro International	Water			01/08/2018	01/09/2018	EPA 200.8	7440-50-8	Copper	27.1		ug/L
18A0070-01	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/09/2018	EPA 200.8	7440-50-8	Copper	30.5		ug/L
18A0070-03	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/09/2018	EPA 200.8	7440-50-8	Copper	16.4		ug/L
BGA0139-BLK1	Blank	Hydro International	Water			01/08/2018	01/09/2018	EPA 200.8	7440-50-8	Copper	0.500	U	ug/L
BGA0139-BS1	LCS	Hydro International	Water			01/08/2018	01/09/2018	EPA 200.8	7440-50-8	Copper	26.8		ug/L
BGA0139-BLK1	Blank	Hydro International	Water			01/08/2018	01/09/2018	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BGA0139-BS1	LCS	Hydro International	Water			01/08/2018	01/09/2018	EPA 200.8	7440-66-6	Zinc	84.7		ug/L
18A0070-01	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/09/2018	EPA 200.8	7440-66-6	Zinc	96.1		ug/L
18A0070-03	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/09/2018	EPA 200.8	7440-66-6	Zinc	51.4		ug/L
BGA0139-BLK1	Blank	Hydro International	Water			01/08/2018	01/09/2018	EPA 200.8	7440-66-6	Zinc	4.00	U	ug/L
BGA0139-BS1	LCS	Hydro International	Water			01/08/2018	01/09/2018	EPA 200.8	7440-66-6	Zinc	79.5		ug/L
BGA0140-BLK1	Blank	Hydro International	Water			01/08/2018	01/08/2018	EPA 6010C	7440-70-2	Calcium	0.0500	U	mg/L
BGA0140-BS1	LCS	Hydro International	Water			01/08/2018	01/08/2018	EPA 6010C	7440-70-2	Calcium	10.4		mg/L
18A0070-01	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/08/2018	EPA 6010C	7440-70-2	Calcium	14.1		mg/L
18A0070-03	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/08/2018	EPA 6010C	7440-70-2	Calcium	17.0		mg/L
BGA0140-BLK1	Blank	Hydro International	Water			01/08/2018	01/08/2018	EPA 6010C	7439-95-4	Magnesium	0.0500	U	mg/L
BGA0140-BS1	LCS	Hydro International	Water			01/08/2018	01/08/2018	EPA 6010C	7439-95-4	Magnesium	10.8		mg/L
18A0070-01	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/08/2018	EPA 6010C	7439-95-4	Magnesium	3.48		mg/L
18A0070-03	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/08/2018	01/08/2018	EPA 6010C	7439-95-4	Magnesium	4.22		mg/L
BGA0174-BLK1	Blank	Hydro International	Water			01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BGA0174-BS1	LCS	Hydro International	Water			01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-50-8	Copper	25.3		ug/L
BGA0174-DUP1	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-50-8	Copper	11.8		ug/L
BGA0174-MS1	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-50-8	Copper	35.6		ug/L
18A0070-02	WUFF-IN	Hydro International	Surface Water	01/04/2018	01/05/2018	01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-50-8	Copper	11.7		ug/L
18A0070-04	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-50-8	Copper	12.0		ug/L
BGA0174-BLK1	Blank	Hydro International	Water					EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BGA0174-BS1	LCS	Hydro International	Water			01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-50-8	Copper	25.4		ug/L
BGA0174-BLK1	Blank	Hydro International	Water					EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BGA0174-BS1	LCS	Hydro International	Water			01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	75.2		ug/L
BGA0174-DUP1	WUFF-IN	•		01/04/2018				EPA 200.8-Dissolved	7440-66-6	Zinc	36.5		ug/L
BGA0174-MS1	WUFF-IN	-						EPA 200.8-Dissolved	7440-66-6	Zinc	109		ug/L
18A0070-02	WUFF-IN	•						EPA 200.8-Dissolved	7440-66-6	Zinc	36.3		ug/L

## Data\_18A0070

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
18A0070-04	WUFF-OUT	Hydro International	Surface Water	01/04/2018	01/05/2018	01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	39.2		ug/L
BGA0174-BLK1	Blank	Hydro International	Water			01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BGA0174-BS1	LCS	Hydro International	Water			01/09/2018	01/10/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	72.8		ug/L



24 January 2018

Dylan Ahearn Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

Associated SDG ID(s)

18A0070

N/A



Digitally signed by Amanda
Volgardsen
DN: c=US, st=Washington,
I=Tukwila, o=Analytical
Resources, Inc., ou=Client
Services, cn=Amanda
Volgardsen,
email=amandav@arilabs.com
Date: 2018.01.24 16:45:05 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in itentirety.

Cert# 100006

PJLA Testing

4611 S. 134th Place, Suite 100 • Tukwila, WA 98168 • Ph: (206) 695-6200 • Fax: (206) 695-6202



2200 Sixth Avenue | Suite 1100 | 15/18 Seattle, Washington | 98121

p 206 441 9080 | f 206 441 9108

## Chain of Custody Record

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# ETS

#### Environmental Technical Services

-Soil, Water & Air Testing & Monitoring -Analytical Labs

-Technical Support

975 Transport Way, Suite 2 Petaluma, CA 94954 (707) 778-9605/FAX 778-9612

Serving people and the environment so that both benefit.

e-mail: entech@pacbell.net

OMPANY:	Analytical Re	esources, Inc	c., 4611 S. 134 <sup>th</sup>	Place, Suite 1	00, Tukwila, W	/A 98168		ANALYST(S)	SUPERVISOR
	Amanda Vol	•			DATE	DATE	DATE	S. Santos	D. Jacobson
	Hydro Intern		lo Filter				COMPLETED	L. Quijano	LAB DIRECTOR
SITE:	Oregon-Was	shington			1/4/2018	1/9/2018	1/18/2018		G.S. Conrad,PhI
	PAI	RTICLE SIZ	E DISTRIBUTION	ON (PSD), TS	S & TVSS AN	ALYSIS & F	REPORT – 5 P.	ART	
LAB	SAMPLE	SOURCE	SUSPENDED				SUSPENDED		SUSPENDED
SAMPLE		of	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SEDIMENT CONC
NUMBER	ID	WATER	mg/l @ ≥500 μ	mg/l @ 125 μ	mg/l @ 63 μ	mg/l @ 32 μ	mg/l @ 4 μ	mg/l @ 1 μ	TSS mg/l
07615-1	HI-49HEC/RW	WUFF-IN	0.2	1.7	1.5		9.1	17.1	30.0
	18A0070-		0.7%	5.7%	5.1%		30.7%	57.8%	
						Total SSC b	y Summation →	29.6	
07615-2	HI-50HEC/RW		0.0	0.2	0.2		1.0	2.7	4.0
	18A0070-	03 D & F	0.0%	4.9%	4.9%		24.4%	65.9%	
						Total SSC b	y Summation →	4.1	
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
			,,_,,,,				y Summation →	0.0	
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						Total SSC b	y Summation $\rightarrow$	0.0	
LAB	SAMPLE	SOURCE	Water pH	ECw	COLOR,	COLOR	TOTAL IRON	TOTAL	VOLATILE
SAMPLE		of	2 - 6287.4	[Spec Cond]	TRUE	APPARENT	and the second second	SUSPENDED	SOLIDS (TVSS)
NUMBER	ID	WATER	-log[H+]	µS/cm	PtCo Units	PtCo Units	mg/l		mg/l
07607-1	HI-49HEC/RW	WHEE IN							30.0
07007-1	18A0070-								30.0
07607-2	HI-50HEC/RW								4.0
	18A0070-	03 D & F							

#### COMMENTS

The matrix has a very low concentration of TSS particles amounting to  $\sim$ 30 ppm in the input sample; and the output sample is not much more than a tenth of that amount. The overall average reduction in TSS is >86%. The range is very narrow in this case at just 86.1%-86.7% (TSS by summation vs TSS by analytical method). The reductions in each fraction are very substantial as follows: 100%, 88.2%, 86.7%, 89.0%, and 84.2%. Because TVSS data were generated, the amount of volatiles is known and calculates to be at 100% in both the input and output samples. This obviously means that virtually all of the particulate matter is organic in nature; probably mostly leaf matter and other vegetation debris, although anthropogenic materials, e.g. paper, polymer fibers, etc., may be a part of the overall mix of organics. The RPDs are both excellent as follows:  $\pm$ 0.7%; and  $\pm$ 1.2%.

\\\ NOTES: Tests were done according to methodology as per Association of Testing Materials (ASTM): Suspended Sediment Concentration

– Modified ASTM D3977 (Practice for Determining Suspended-Sediment Concentration in Water Samples). Standard Methods is followed for
the other tests: Color - 2120 C; Spec Cond. (ECw) - 2510 B; Iron - 3500-Fe B; pH - 4500-H+ B; TRPH - 5520 C.

Page 3 of 26 18A0070 ARISample FINAL 24 Jan 2018 1642



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	18A0070-01	Water	04-Jan-2018 05:45	05-Jan-2018 14:00
WUFF-IN	18A0070-02	Water	04-Jan-2018 05:45	05-Jan-2018 14:00
WUFF-OUT	18A0070-03	Water	04-Jan-2018 05:55	05-Jan-2018 14:00
WUFF-OUT	18A0070-04	Water	04-Jan-2018 05:55	05-Jan-2018 14:00

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### Case Narrative

#### Sample receipt

Samples as listed on the preceding page were received January 5, 2018 under ARI workorder 18A0070. For details regarding sample receipt, please refer to the Cooler Receipt Form. The samples were split by sample receiving prior to analysis. The PSD, TVSS and TSS analysis was subcontracted to ETS Labs. The SSC analysis was subcontracted to MTC.

#### Total and Dissolved Metals - EPA Method 200.8

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

A dissolved matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### Total Hardness - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

#### Wet Chemistry (O-Phos, T-Phos)

The samples were prepared and analyzed within the recommended holding times.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within QC limits.

An O-Phos matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recovery and duplicate RPD were within QC limits.

Analytical Resources, Inc.

Printed: 1/5/2018 3:22:27PM

#### WORK ORDER

18A0070	

Client: Herrera Environmental Consultants Project Manager: Amanda Volgardsen

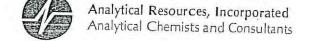
Project: Hydro International Project Number: [none]

#### **Preservation Confirmation**

Container ID	Container Type	рН	
18A0070-01 A	HDPE NM, 500 mL, 1:1 HNO3	42	20185
18A0070-01 B	Small OJ, 500 mL		Polity
18A0070-01 C	Small OJ, 500 mL, 9N H2SO4	12	
18A0070-01 D	Large OJ, 1000 mL		
18A0070-01 E	Large OJ, 1000 mL		
18A0070-01 F	Large OJ, 1000 mL		
18A0070-02 A	HDPE NM, 500 mL	72	Fail
18A0070-03 A	HDPE NM, 500 mL, 1:1 HNO3	12	10953
18A0070-03 B	Small OJ, 500 mL		prof. e.g.
18A0070-03 C	Small OJ, 500 mL, 9N H2SO4	42	logiss
18A0070-03 D	Large OJ, 1000 mL		* "
18A0070-03 E	Large OJ, 1000 mL		
18A0070-03 F	Large OJ, 1000 mL		
18A0070-04 A	HDPE NM, 500 mL	72	Fa:1

Preservation Confirmed By

1/5/18 Date



# Cooler Receipt Form

ARI Client: Herrera	7	Declary N		
COC No(s):	No	Project Name:		
Assigned ARI Job No: 18A	-(00 7K)	Delivered by: Fed-Ex UPS Co	urier Hand Delivered Ot	her:
Preliminary Examination Phase		Tracking No:		NA
Were intact, properly signed an	d dated custody seals attached	d to the outside of to cooler?	YES	NO
Were custody papers included to			YES	NO
Were custody papers properly f Temperature of Cooler(s) (°C) ( Time:	illed out (ink, signed, etc.) recommended 2.0-6.0 °C for cl	hemistry) F. 9	YES	NO
If cooler temperature is out of co	ompliance fill out form 00070F	201	Toma Cua ID# ID#	20211
Cooler Accepted by:	RF	Date: 1/5/10 -	Temp Gun ID#:	10 2505
		ns and attach all shipping documents		
Log-In Phase:	, and the second second	is and attach all shipping documents		
Were all bottles sealed in individ Did all bottles arrive in good con Were all bottle labels complete a Did the number of containers list Did all bottle labels and tags agre Were all bottles used correct for	was used? Bubble Wr priate)?  lual plastic bags?  dition (unbroken)?  and legible?  ded on COC match with the nur ee with custody papers?  the requested analyses?  require preservation? (attach p	mber of containers received?	NA YES YES YES YES NA YES	00 NO
Was sufficient amount of sample	sent in each hottle?	***************************************	YES YES	NO
Date VOC Trip Blank was made	at ADI		YES	NO
Was Sample Split by ARI:	AV (FS) Data/Time: 1/6	713 1572 Equipment: Chury	MA"	
Samples Logged by:	BFDat	1-1.2	13/11/18 Split by	12
Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle		
*		Sample ID on Bottle	Sample ID on	COC
	I			
				_
Additional Notes, Discrepancies	s, & Resolutions:			
By: Date	e <u>;</u>	1		
Small Air Bubbles Pestubble = 2nm 2-4 mm	FULLOF VI POCHER	Small → "sm" (<2 mm)		
	2 337613	Peabubbles > "pb" (2 to <4 mm)	4	
	6 6 6	Large → "lg" (4 to < 6 mm)		
,		Headspace → "hs" (>6 mm)		

0016F 3/2/10

Cooler Receipt Form

Revision 014

# Materials Testing & Consulting, Inc.



Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International (18A0070)	Date Received: January 8, 2018
<b>Project #:</b> 16T001-035	Sampled By: Others
Client: Analytical Resources, Inc.	Date Reported: January 24, 2018
Source: Multiple	Tested By: B. Goble
MTC Sample#: Multiple	

#### CASE NARRATIVE

<ol> <li>Two samples were submitted for sediment concentration by ASTM D3977, Method C.</li> <li>The coarse material was screened over a No. 230 sieve.</li> <li>The suspended solids are reported in mg/L.</li> <li>The data is provided in a summary table.</li> <li>There were no other noted anomalies in this project.</li> </ol>

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

# Page 9 of 26 18A0070 ARISample FINAL 24 Jan 2018 1642

# Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

**Project:** Hydro International (18A0070) Client: Analytical Resources, Inc. Project #: 16T001-035 Date Received: January 8, 2018 Sampled by: Others Tested by: B. Goble Date Tested: January 19, 2018

#### Suspended Sediment Concentration ASTM D3977 Method C

Client Sample ID	MTC Sample ID	Sampling Date	Coarse Fraction SSC (>63µm) (mg/L)	FineFraction SSC (<63µm) (mg/L)	Total Suspended Sediment Concentration (mg/L)
WUFF-IN	S18-0020	1/4/2018	10.9	28.5	39.4
WUFF-OUT	S18-0021	1/4/2018	0.7	7.3	8.0

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Silverdale ~ 360.698.6787

Tukwila ~ 206.241.1974

Visit our website: www.mtc-inc.net

**Regional Offices:** Olympia ~ 360.534.9777

Bellingham ~ 360.647.6111



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-IN 18A0070-01 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 200.8
 Sampled: 01/04/2018 05:45

 Instrument: ICPMS2
 Analyzed: 09-Jan-2018 15:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0139 Sample Size: 25 mL Prepared: 08-Jan-2018 Final Volume: 25 mL

Reporting Dilution Limit Analyte CAS Number Result Units Notes 7440-50-8 0.500 30.5 ug/L Copper Zinc 7440-66-6 1 4.00 96.1 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-IN 18A0070-01 (Water)

Metals and Metallic Compounds

 Method: EPA 6010C
 Sampled: 01/04/2018 05:45

 Instrument: ICP2
 Analyzed: 08-Jan-2018 11:06

Sample Preparation: Preparation Method: TWC EPA 3010A

Preparation Batch: BGA0140 Sample Size: 25 mL Prepared: 08-Jan-2018 Final Volume: 25 mL

Reporting CAS Number Dilution Limit Units Analyte Result Notes Calcium 7440-70-2 0.0500 14.1 mg/L Magnesium 7439-95-4 1 0.0500 3.48 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-IN 18A0070-01 (Water)

**Wet Chemistry** 

Method: SM 4500-P E-99

Sampled: 01/04/2018 05:45

Instrument: UV1800-2

Analyzed: 05-Jan-2018 18:38

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0135 Sample Size: 50 mL Prepared: 05-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0120 mg-P/L

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0136 Sample Size: 25 mL Prepared: 06-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0080 0.122 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100 Project Number: [none] Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 24-Jan-2018 16:42

#### **WUFF-IN** 18A0070-01 (Water)

Calculation

Sampled: 01/04/2018 05:45 Method: SM 2340 B-97 Instrument: [CALC] Analyzed: 08-Jan-2018 11:06

Sample Preparation: Preparation Method: [CALC] Preparation Batch: [CALC]

Prepared: 08-Jan-2018

Final Volume: 1

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Hardness		1	0.331	49.5	mg/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-IN 18A0070-02 (Water)

Metals and Metallic Compounds (dissolved)

 Method: EPA 200.8
 Sampled: 01/04/2018 05:45

 Instrument: ICPMS2
 Analyzed: 10-Jan-2018 14:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0174 Sample Size: 25 mL Prepared: 09-Jan-2018 Final Volume: 25 mL

Reporting Dilution Limit Analyte CAS Number Result Units Notes Copper, Dissolved 7440-50-8 0.500 11.7 ug/L Zinc, Dissolved 7440-66-6 1 4.00 36.3 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-OUT 18A0070-03 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 200.8
 Sampled: 01/04/2018 05:55

 Instrument: ICPMS2
 Analyzed: 09-Jan-2018 16:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0139 Sample Size: 25 mL Prepared: 08-Jan-2018 Final Volume: 25 mL

Reporting Dilution Limit Units Analyte CAS Number Result Notes 7440-50-8 0.500 16.4 ug/L Copper Zinc 7440-66-6 1 4.00 51.4 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-OUT 18A0070-03 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 6010C
 Sampled: 01/04/2018 05:55

 Instrument: ICP2
 Analyzed: 08-Jan-2018 11:36

Sample Preparation: Preparation Method: TWC EPA 3010A

Preparation Batch: BGA0140 Sample Size: 25 mL Prepared: 08-Jan-2018 Final Volume: 25 mL

Reporting CAS Number Dilution Limit Units Analyte Result Notes Calcium 7440-70-2 0.0500 17.0 mg/L Magnesium 7439-95-4 1 0.0500 4.22 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-OUT 18A0070-03 (Water)

	em	

Method: SM 4500-P E-99

Sampled: 01/04/2018 05:55

Instrument: UV1800-2

Analyzed: 05-Jan-2018 18:39

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0135 Sample Size: 50 mL Prepared: 05-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0120 mg-P/L

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0136 Sample Size: 25 mL Prepared: 06-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0080 0.0480 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-OUT 18A0070-03 (Water)

Calculation

 Method: SM 2340 B-97
 Sampled: 01/04/2018 05:55

 Instrument: [CALC]
 Analyzed: 08-Jan-2018 11:36

That y 200. 00 but 2010 11.5

Sample Preparation: Preparation Method: [CALC]
Preparation Batch: [CALC]

Prepared: 08-Jan-2018 Final Volume: 1

Analyte CAS Number Dilution Result Units Notes

Hardness 1 0.331 59.9 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### WUFF-OUT 18A0070-04 (Water)

Metals and Metallic Compounds (dissolved)

 Method: EPA 200.8
 Sampled: 01/04/2018 05:55

 Instrument: ICPMS2
 Analyzed: 10-Jan-2018 13:57

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0174 Sample Size: 25 mL Prepared: 09-Jan-2018 Final Volume: 25 mL

Reporting Dilution Limit Analyte CAS Number Result Units Notes Copper, Dissolved 7440-50-8 0.500 12.0 ug/L Zinc, Dissolved 7440-66-6 1 4.00 39.2 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project Number: [none]
Project Manager: Dylan Ahearn

**Reported:** 24-Jan-2018 16:42

#### Metals and Metallic Compounds - Quality Control

#### Batch BGA0139 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0139-BLK1)				Prepa	ared: 08-Jan	-2018 Ana	lyzed: 09-J	an-2018 12:	48		
Copper	63	ND	0.500	ug/L							U
Copper	65	ND	0.500	ug/L							U
Zinc	66	ND	4.00	ug/L							U
Zinc	67	ND	4.00	ug/L							U
LCS (BGA0139-BS1)				Prepa	ared: 08-Jan	-2018 Ana	lyzed: 09-J	an-2018 13:	30		
Copper	63	27.1	0.500	ug/L	25.0		108	80-120			
Copper	65	26.8	0.500	ug/L	25.0		107	80-120			
Zinc	66	84.7	4.00	ug/L	80.0		106	80-120			
Zinc	67	79.5	4.00	ug/L	80.0		99.4	80-120			

Analytical Resources, Inc.

Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### Metals and Metallic Compounds - Quality Control

#### Batch BGA0140 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0140-BLK1)			Prepa	ared: 08-Jan-	2018 Ana	lyzed: 08-J	an-2018 10:	45		
Calcium	ND	0.0500	mg/L							U
Magnesium	ND	0.0500	mg/L							U
LCS (BGA0140-BS1)			Prepa	ared: 08-Jan-	2018 Ana	lyzed: 08-J	an-2018 11:	23		
Calcium	10.4	0.0500	mg/L	10.0		104	80-120			
Magnesium	10.8	0.0500	mg/L	10.0		108	80-120			

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project Number: [none]
Project Manager: Dylan Ahearn

**Reported:** 24-Jan-2018 16:42

#### Metals and Metallic Compounds (dissolved) - Quality Control

#### Batch BGA0174 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

			Reporting		Spike	Source		%REC		RPD	
QC Sample/Analyte	Isotope	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Blank (BGA0174-BLK1)				Prepa	ared: 09-Jan	-2018 Ana	lyzed: 10-J	an-2018 13:	43		
Copper, Dissolved	63	ND	0.500	ug/L							U
Copper, Dissolved	65	ND	0.500	ug/L							U
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
LCS (BGA0174-BS1)				Prepa	ared: 09-Jan	-2018 Ana	lyzed: 10-J	an-2018 14:	24		
Copper, Dissolved	63	25.3	0.500	ug/L	25.0		101	80-120			
Copper, Dissolved	65	25.4	0.500	ug/L	25.0		102	80-120			
Zinc, Dissolved	66	75.2	4.00	ug/L	80.0		94.0	80-120			
Zinc, Dissolved	67	72.8	4.00	ug/L	80.0		91.0	80-120			
Duplicate (BGA0174-DUP1)		Source	e: 18A0070-02	Prepa	ared: 09-Jan	-2018 Ana	lyzed: 10-J	an-2018 14:	10		
Copper, Dissolved	63	11.8	0.500	ug/L		11.7			0.49	20	
Zinc, Dissolved	66	36.5	4.00	ug/L		36.3			0.46	20	
Matrix Spike (BGA0174-MS	1)	Source	:: 18A0070-02	Prepa	ared: 09-Jan	-2018 Ana	lyzed: 10-J	an-2018 14:	19		
Copper, Dissolved	63	35.6	0.500	ug/L	25.0	11.7	95.4	75-125			
Zinc, Dissolved	66	109	4.00	ug/L	80.0	36.3	90.3	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.

Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project Number: [none]
Project Manager: Dylan Ahearn

**Reported:** 24-Jan-2018 16:42

#### **Wet Chemistry - Quality Control**

#### Batch BGA0135 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0135-BLK1)			Prepa	red: 05-Jan-	-2018 Ana	lyzed: 05-J	an-2018 18:	37		
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BGA0135-BS1)			Prepa	red: 05-Jan-	-2018 Ana	lyzed: 05-J	an-2018 18:	37		
Orthophosphorus	0.152	0.0040	mg-P/L	0.150		101	90-110			
Duplicate (BGA0135-DUP1)	Source:	18A0070-01	Prepa	red: 05-Jan-	-2018 Ana	lyzed: 05-J	an-2018 18:	38		
Orthophosphorus	0.0130	0.0040	mg-P/L		0.0120			8.00	20	
Matrix Spike (BGA0135-MS1)	Source:	18A0070-01	Prepa	red: 05-Jan-	-2018 Ana	lyzed: 05-J	an-2018 18:	38		
Orthophosphorus	0.110	0.0040	mg-P/L	0.0999	0.0120	98.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.

Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100

Seattle WA, 98121

Project Number: [none]
Project Manager: Dylan Ahearn

**Reported:** 24-Jan-2018 16:42

#### **Wet Chemistry - Quality Control**

#### Batch BGA0136 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0136-BLK1)			Prepa	ared: 06-Jan	-2018 Ana	alyzed: 06-J	an-2018 16:	41		
Total Phosphorus	ND	0.0080	mg-P/L							U
Blank (BGA0136-BLK2)			Prepa	ared: 06-Jan	-2018 Ana	alyzed: 06-J	an-2018 16:	45		
Total Phosphorus	ND	0.0080	mg-P/L							U
Blank (BGA0136-BLK4)			Prepa	ared: 06-Jan	-2018 Ana	alyzed: 06-J	an-2018 16:	47		
Total Phosphorus	ND	0.0080	mg-P/L							U
LCS (BGA0136-BS1)			Prepa	ared: 06-Jan	-2018 Ana	alyzed: 06-J	an-2018 16:	41		
Total Phosphorus	0.306	0.0080	mg-P/L	0.300		102	90-110			
LCS (BGA0136-BS2)			Prepa	ared: 06-Jan	-2018 Ana	alyzed: 06-J	an-2018 16:	46		
Total Phosphorus	0.304	0.0080	mg-P/L	0.300		101	90-110			
LCS (BGA0136-BS3)			Prepa	ared: 06-Jan	-2018 Ana	alyzed: 06-J	an-2018 16:	48		
Total Phosphorus	0.304	0.0080	mg-P/L	0.300		101	90-110			

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100 Project Number: [none] Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 24-Jan-2018 16:42

Certifications

#### **Certified Analyses included in this Report**

EPA 200.8 in Water	
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 6010C in Water	

Analyte

Calcium WADOE, NELAP, DoD-ELAP Magnesium WADOE, NELAP, DoD-ELAP

SM 4500-P E-99 in Water

WADOE, NELAP Orthophosphorus Total Phosphorus WADOE, NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: [none]Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:42

#### **Notes and Definitions**

U This analyte is not detected above the applicable reporting or detection limit.

J Estimated concentration value detected below the reporting limit.

D The reported value is from a dilution

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

[2C] Indicates this result was quantified on the second column on a dual column analysis.

# **January 7, 2018**

## Data\_18A0093

BGA0172-BS1   LCS	ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method CAS	Compound	Value	Q	Units
18A0093-03   WUFF-OUT   13-95805-000 Water   Mode	18A0093-01	WUFF-IN	13-05605-000	Water	01/08/2018	01/08/2018	01/10/2018	01/15/2018	SM 2340 B-97	Hardness	70.2		mg/L
BGA0172-BLY1   Blank	18A0093-03	WUFF-OUT	13-05605-000	Water	01/08/2018	01/08/2018	01/10/2018	01/15/2018	SM 2340 B-97	Hardness	74.9		
BGA0172-BST   LCS	BGA0172-BLK1	Blank	13-05605-000	Water			01/09/2018	01/09/2018	EPA 200.8 7440-50-8	Copper	0.500	U	
18A0099-01   WUFF-IN   13-05605-000   Water   10/08/2018   01/08/2018   01/08/2018   01/08/2018   07/08/201	BGA0172-BS1	LCS	13-05605-000	Water			01/09/2018	01/09/2018	EPA 200.8 7440-50-8	• • •	26.5		
18A0093-03	18A0093-01	WUFF-IN	13-05605-000	Water	01/08/2018	01/08/2018	01/09/2018	01/09/2018	EPA 200.8 7440-50-8		19.2		
BGA0172-BLK1   Blank	18A0093-03	WUFF-OUT	13-05605-000	Water							18.2		
BGA0172-BS1   LCS	BGA0172-BLK1	Blank	13-05605-000	Water			01/09/2018	01/09/2018	EPA 200.8 7440-50-8		0.500	U	
BGA0172-BLK1   Blank   13-05605-000   Water   01/08/2018   01/09/2018   EPA 200.8 7440-66-6   Cinc   79.9   ug/L   18A0093-01   WUFF-IN   13-05605-000   Water   01/08/2018   01/08/2018   01/09/2018   EPA 200.8 7440-66-6   Cinc   63.8   ug/L   18A0093-01   WUFF-IN   13-05605-000   Water   01/08/2018   01/09/2018   01/09/2018   EPA 200.8 7440-66-6   Cinc   63.6   ug/L   Cinc   63.6   ug/L   Cinc	BGA0172-BS1	LCS	13-05605-000	Water			01/09/2018	01/09/2018	EPA 200.8 7440-50-8		26.2		
BGA0172-BS1   LCS	BGA0172-BLK1	Blank	13-05605-000	Water			01/09/2018	01/09/2018	EPA 200.8 7440-66-6		4.00	U	
18A0093-03   WUFF-OUT   13-05605-000   Water   01/08/2018   01/09/20	BGA0172-BS1	LCS	13-05605-000	Water			01/09/2018	01/09/2018	EPA 200.8 7440-66-6	Zinc	79.9		
BABANT2-BLK1   Blank   13-05605-000   Water   01/09/2018   01/09/201	18A0093-01	WUFF-IN	13-05605-000	Water	01/08/2018	01/08/2018	01/09/2018	01/09/2018	EPA 200.8 7440-66-6	Zinc	64.8		ug/L
BGA0172-BLK1   Blank   13-05605-000   Water   01/09/2018   01/09/2018   EPA 20.08   7440-66-6   Zinc   4.00   U ug/L	18A0093-03	WUFF-OUT	13-05605-000	Water	01/08/2018	01/08/2018	01/09/2018	01/09/2018	EPA 200.8 7440-66-6	Zinc	62.5		_
BGA0174-BS1	BGA0172-BLK1	Blank	13-05605-000	Water			01/09/2018	01/09/2018	EPA 200.8 7440-66-6	Zinc	4.00	U	_
BGA0174-BLK1   Blank	BGA0172-BS1	LCS	13-05605-000	Water			01/09/2018	01/09/2018	EPA 200.8 7440-66-6	Zinc	76.5		
BGA0174-BS1	BGA0174-BLK1	Blank	13-05605-000	Water			01/09/2018	01/10/2018	EPA 200.8 7440-50-8	Copper	0.500	U	
18A0093-02   WUFF-IN   13-05605-000   Water   101/08/2018   01/08/2018   01/08/2018   01/10/2018   EPA 200.8 7440-50-8   Copper   9.88   ug/L   18A0093-04   WUFF-IN   13-05605-000   Water   01/08/2018   01/08/2018   01/09/2018   01/10/2018   EPA 200.8 7440-50-8   Copper   0.500   U ug/L   EPA 200.8 7440-50-8   Cinc   0.500   U ug/L   EPA 200.8 7440-50-8   Cinc   0.500   U ug/L   EPA 200.8 7440-50-6   Cinc   0.500   Cinc   0.500   U ug/L   EPA 200.8 7440-50-6   Cinc   0.500   Cinc   0.5	BGA0174-BS1	LCS								• • •			
18A0093-04   WUFF-OUT   13-05605-000   Water   01/08/2018   01/08/2018   01/10/2018   EPA 200.8   7440-50-8   Copper   10.3   Ug/L   BGA0174-BLK1   Blank   13-05605-000   Water   01/09/2018   01/10/2018   EPA 200.8   7440-50-8   Copper   25.4   Ug/L   BGA0174-BLK1   Blank   13-05605-000   Water   01/09/2018   01/10/2018   EPA 200.8   7440-50-8   Copper   25.4   Ug/L   Ug/L   BGA0174-BLK1   Blank   13-05605-000   Water   01/09/2018   01/10/2018   EPA 200.8   7440-50-6   Cinc   4.00   Ug/L   BGA0174-BLK1   Blank   13-05605-000   Water   01/08/2018   01/08/2018   01/10/2018   EPA 200.8   7440-50-6   Cinc   75.2   Ug/L   Cinc   13-05605-000   Water   01/08/2018   01/08/2018   01/10/2018   EPA 200.8   7440-50-6   Cinc   75.2   Ug/L   Cinc   36.1   Ug/L   Cinc   36.5   Ug/L   Cin	18A0093-02	WUFF-IN	13-05605-000	Water	01/08/2018	01/08/2018				• • •			
BGA0174-BL11   Blank   13-05605-000   Water		WUFF-OUT	13-05605-000	Water						• • • • • • • • • • • • • • • • • • • •			
BGA0174-BS1   LCS	BGA0174-BLK1									• • • • • • • • • • • • • • • • • • • •		U	
BGA0174-BLK1   Blank   13-05605-000   Water										• • • • • • • • • • • • • • • • • • • •			
BGA0174-BS1												U	
18A0093-02   WUFF-IN   13-05605-000   Water   18A0093-04   WIFF-IN   13-05605-000   Water   18A0093-04   WUFF-IN   13-05605-000   Water   18A0093-01   WUFF-IN													
18A0093-04   WUFF-OUT   13-05605-000   Water   O1/08/2018   O1/09/2018   O1/10/2018   EPA 200.8   7440-66-6   Zinc   38.5   Ug/L   O1/09/2018   O1/09/2018   O1/10/2018   EPA 200.8   7440-66-6   Zinc   38.5   Ug/L   O1/09/2018   O1/09/2018   O1/09/2018   O1/09/2018   EPA 200.8   7440-66-6   Zinc   38.5   Ug/L   O1/09/2018   O1/09/2018   O1/09/2018   O1/09/2018   EPA 200.8   7440-66-6   Zinc   72.8   Ug/L   O1/09/2018   O1/09/2018   O1/09/2018   O1/09/2018   EPA 200.8   7440-66-6   Zinc   72.8   Ug/L   O1/09/2018   O1/0					01/08/2018	01/08/2018	01/09/2018	01/10/2018	EPA 200.8 7440-66-6				
BGA0174-BLK1         Blank         13-05605-000         Water         01/09/2018         01/10/2018         EPA 200.8         7440-66-6         Zinc         4.00         U         ug/L           BGA0174-BST         LCS         13-05605-000         Water         01/10/2018         01/10/2018         PPA 200.8         7440-66-6         Zinc         72.8         ug/L           BGA0186-BLK1         Blank         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F7723-14-0         Total Phosphorus         0.0160         U mg-P/L           BGA0186-BSLK2         Blank         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F7723-14-0         Total Phosphorus         0.0160         U mg-P/L           BGA0186-BS3         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F7723-14-0         Total Phosphorus         0.250         * mg-P/L           BGA0190-BLK1         Blank         13-05605-000         Water         01/10/2018         01/10/2018         M 4500-F1723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0190-BS1         LCS         13-05605-000         Water         01/10/2018         01/10/2018         M 4500-F1426-54-42         Orthophosph										Zinc			
BGA0174-BS1         LCS         13-05605-000 Water         Water         01/09/2018 01/10/2018 01/10/2018 SM 4500-F7723-14-0         Total Phosphorus 0.0160 U mg-P/L SM 500-F7723-14-0         Total Phosphorus 0.050 U mg-P/L SM 500-F7723-14-0         Total Phosphorus 0.250 * mg-P/L SM 500-F7723-14-0         Total Phosphorus 0.250 * mg-P/L SM 500-F7723-14-0         Total Phosphorus 0.254 * mg-P/												U	
BGA0186-BLK1         Blank         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F 7723-14-0         Total Phosphorus         0.0160         Umg-P/L           BGA0186-BLK2         Blank         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F 7723-14-0         Total Phosphorus         0.0160         Umg-P/L           BGA0186-BS1         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F 7723-14-0         Total Phosphorus         0.250         *mg-P/L           BGA0186-BS2         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F 7723-14-0         Total Phosphorus         0.254         *mg-P/L           BGA0190-BLK1         Blank         13-05605-000         Water         01/09/2018         01/10/2018         SM 4500-F 1723-14-0         Total Phosphorus         0.254         *mg-P/L           BGA0190-BLK1         Blank         13-05605-000         Water         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.040         Umg-P/L           BGA0190-BLK1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus													
BGA0186-BLK2         Blank         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F,7723-14-0         Total Phosphorus         0.0160         U mg-P/L           BGA0186-BS2         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F,7723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0186-BS3         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F,7723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0190-BLK1         Blank         13-05605-000         Water         01/09/2018         01/09/2018         SM 4500-F,7723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0190-BS1         LCS         13-05605-000         Water         01/09/2018         01/09/2018         SM 4500-F,1426-54-42         Orthophosphorus         0.0040         U mg-P/L           BGA0190-BS1         UVFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F,1426-54-42         Orthophosphorus         0.0080         mg-P/L           BGA0190-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 45												U	
BGA0186-BS1         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F         7723-14-0         Total Phosphorus         0.250         * mg-P/L           BGA0186-BS2         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F         7723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0190-BLK1         Blank         13-05605-000         Water         01/10/2018         01/10/2018         SM 4500-F         7723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0190-BLK1         Blank         13-05605-000         Water         01/09/2018         01/09/2018         SM 4500-F         1426-54-42         Orthophosphorus         0.0040         U mg-P/L           BGA0190-BLK1         BUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         SM 4500-F         1426-54-42         Orthophosphorus         0.153         mg-P/L           BGA0190-MIST         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         SM 4500-F         1426-54-42         Orthophosphorus         0.108         mg-P/L           18A0093-03         WUFF-IN         13-05605-000         Water         01/08/2018 <td></td>													
BGA0186-BS2         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F 7723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0190-BLK1         Blank         13-05605-000         Water         01/09/2018         01/10/2018         SM 4500-F 7723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0190-BS1         LCS         13-05605-000         Water         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0040         U mg-P/L           BGA0190-DUP1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           BGA0190-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4										· ·		*	
BGA0186-BS3         LCS         13-05605-000         Water         01/10/2018         01/11/2018         SM 4500-F 7723-14-0         Total Phosphorus         0.254         * mg-P/L           BGA0190-BLK1         Blank         13-05605-000         Water         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0040         U mg-P/L           BGA0190-DUP1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0040         U mg-P/L           BGA0190-DUP1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           BGA0190-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/08/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/08/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           BGA0196-BLK1         Blank         13-05605-000         Water         01/08/2018 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>· ·</td><td></td><td>*</td><td></td></t<>										· ·		*	
BGA0190-BLK1         Blank         13-05605-000         Water         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0040         U mg-P/L           BGA0190-BS1         LCS         13-05605-000         Water         01/08/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.153         mg-P/L           BGA0190-DUP1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.080         mg-P/L           BGA0190-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0070         mg-P/L           18A0093-03         WUFF-OUT         13-05605-000         Water         01/08/2018         01/08/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0070         mg-P/L           BGA0196-BS1         LCS         13-05605-000         Water         01/08/2												*	
BGA0190-BS1         LCS         13-05605-000         Water         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.153         mg-P/L           BGA0190-DUP1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           BGA0190-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.107         mg-P/L           18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           18A0093-03         WUFF-OUT         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0080         mg-P/L           BGA0196-BLK1         Blank         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010(7440-70-2         Calcium         0.0500         U mg/L           BGA0196-BLY1         WUFF-IN         13-05605-000         Water <td>BGA0190-BLK1</td> <td>Blank</td> <td>13-05605-000</td> <td>Water</td> <td></td> <td></td> <td>01/09/2018</td> <td>01/09/2018</td> <td>SM 4500-F 1426-54-42</td> <td>· ·</td> <td>0.0040</td> <td>U</td> <td></td>	BGA0190-BLK1	Blank	13-05605-000	Water			01/09/2018	01/09/2018	SM 4500-F 1426-54-42	· ·	0.0040	U	
BGA0190-DUP1 WUFF-IN 13-05605-000 Water BGA0190-MS1 WUFF-IN 13-05605-000 Water BGA0190-BS1 LCS WUFF-IN WUFF-IN 13-05605-000 Water BGA0190-BS1 LCS WUFF-IN WUFF-IN 13-05605-000 Water BGA0190-BS1 LCS WUFF-IN 13-05605-000 Water BGA0190-BS1 LCS WATER BGA0190-BS1 WUFF-IN WUFF-IN WUFF-IN WATER BGA0190-BS1 WUFF-IN WUFF-IN WATER BGA0190-BS1 WUFF-IN WUFF-IN WATER BGA0190-BS1 WUFF-IN WUFF-IN WATER BGA0190-BS1 WUFF-IN WATER BGA0190-BS1 WUFF-IN WATER BGA0190-BS1 WUFF-IN WATER BGA0190-BS1 WATER BGA0190-BS1 WUFF-IN WATER BGA0190-BS1 WATER BGA0190-BS1 WUFF-IN WATER BGA0190-BS1							01/09/2018	01/09/2018			0.153		
BGA0190-MS1 WUFF-IN 13-05605-000 Water 10/08/2018 01/08/2018 01/09/2018 SM 4500-F 1426-54-42 Orthophosphorus 0.107 mg-P/L 18A0093-01 WUFF-IN 13-05605-000 Water 10/08/2018 01/08/2018 01/09/2018 SM 4500-F 1426-54-42 Orthophosphorus 0.0080 mg-P/L 18A0093-03 WUFF-OUT 13-05605-000 Water 10/08/2018 01/08/2018 01/09/2018 SM 4500-F 1426-54-42 Orthophosphorus 0.0070 mg-P/L 18A0093-03 WUFF-OUT 13-05605-000 Water 10/08/2018 01/08/2018 01/09/2018 SM 4500-F 1426-54-42 Orthophosphorus 0.0070 mg-P/L 18A0093-03 WUFF-IN 13-05605-000 Water 10/08/2018 01/08/2018 01/09/2018 SM 4500-F 1426-54-42 Orthophosphorus 0.0070 mg-P/L 18A0093-01 WUFF-IN 13-05605-000 Water 10/08/2018 01/08/2018 01/09/2018 SM 4500-F 1426-54-42 Orthophosphorus 0.0070 mg-P/L 18A0093-03 WUFF-IN 13-05605-000 Water 10/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010(7440-70-2 Calcium 10.2 mg/L 18A0093-03 WUFF-OUT 13-05605-000 Water 10/08/2018 01/08/2018 01/08/2018 01/10/2018 EPA 6010(7440-70-2 Calcium 20.3 mg/L 18A0093-03 WUFF-OUT 13-05605-000 Water 10/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010(7440-70-2 Calcium 20.2 mg/L 15-5 mg/L 15-					01/08/2018	01/08/2018							
18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F         1426-54-42         Orthophosphorus         0.0080         mg-P/L           18A0093-03         WUFF-OUT         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F         1426-54-42         Orthophosphorus         0.0070         mg-P/L           BGA0196-BLK1         Blank         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010(7440-70-2)         Calcium         0.0500         U mg/L           BGA0196-BS1         LCS         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010(7440-70-2)         Calcium         10.2         mg/L           BGA0196-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/08/2018         01/15/2018         EPA 6010(7440-70-2)         Calcium         20.3         mg/L           18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/08/2018         01/15/2018         EPA 6010(7440-70-2)         Calcium         20.2         mg/L           18A0093-03         WUFF-OUT         13-05605-000 <td></td>													
18A0093-03         WUFF-OUT         13-05605-000         Water         01/08/2018         01/09/2018         01/09/2018         SM 4500-F 1426-54-42         Orthophosphorus         0.0070         mg-P/L           BGA0196-BLK1         Blank         13-05605-000         Water         01/10/2018         01/15/2018         EPA 6010 (7440-70-2)         Calcium         0.0500         U         mg/L           BGA0196-BS1         LCS         13-05605-000         Water         01/10/2018         01/10/2018         01/15/2018         EPA 6010 (7440-70-2)         Calcium         10.2         mg/L           BGA0196-DUP1         WUFF-IN         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010 (7440-70-2)         Calcium         10.2         mg/L           BGA0196-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010 (7440-70-2)         Calcium         20.3         mg/L           18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010 (7440-70-2)         Calcium         20.2         mg/L           18A0093-03         WUFF-OUT         13-05605-000         Water         01/08/2018 <td></td> <td>WUFF-IN</td> <td></td> <td></td> <td>01/08/2018</td> <td>01/08/2018</td> <td>01/09/2018</td> <td>01/09/2018</td> <td>SM 4500-F 1426-54-42</td> <td>Orthophosphorus</td> <td></td> <td></td> <td>_</td>		WUFF-IN			01/08/2018	01/08/2018	01/09/2018	01/09/2018	SM 4500-F 1426-54-42	Orthophosphorus			_
BGA0196-BLK1 Blank 13-05605-000 Water 01/10/2018 01/15/2018 EPA 6010 (7440-70-2 Calcium 0.0500 U mg/L BGA0196-BS1 LCS 13-05605-000 Water 01/08/2018 01/10/2018 01/15/2018 EPA 6010 (7440-70-2 Calcium 10.2 mg/L BGA0196-DUP1 WUFF-IN 13-05605-000 Water 01/08/2018 01/10/2018 01/15/2018 EPA 6010 (7440-70-2 Calcium 20.3 mg/L BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 (7440-70-2 Calcium 30.5 mg/L 18A0093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 (7440-70-2 Calcium 20.2 mg/L 18A0093-03 WUFF-OUT 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 (7440-70-2 Calcium 20.2 mg/L 18A0093-03 WUFF-OUT 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 (7440-70-2 Calcium 21.5 mg/L 15 m										· · · · · · · · · · · · · · · · · · ·	0.0070		
BGA0196-BS1 LCS 13-05605-000 Water 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 10.2 mg/L BGA0196-DUP1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 20.3 mg/L BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 30.5 mg/L 18A0093-01 WUFF-OUT 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 20.2 mg/L 18A0093-03 WUFF-OUT 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 21.5 mg/L BGA0196-BLK1 Blank 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 21.5 mg/L BGA0196-BS1 LCS 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 10.4 mg/L BGA0196-DUP1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.80 mg/L BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L BGA0193-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.81 mg/L	BGA0196-BLK1		13-05605-000	Water						· · · · · · · · · · · · · · · · · · ·	0.0500	U	
BGA0196-DUP1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 20.3 mg/L 01/08/093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 30.5 mg/L 01/08/093-03 WUFF-OUT 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 20.2 mg/L 01/08/093-03 WUFF-OUT 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 20.2 mg/L 01/10/2018 BGA0196-BLK1 Blank 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 21.5 mg/L 01/10/2018 BGA0196-BS1 LCS 13-05605-000 Water 01/08/2018 01/08/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 10.4 mg/L 01/10/2018 BGA0196-DUP1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 D1/15/2018 EPA 6010 7439-95-4 Magnesium 4.80 mg/L 01/08/093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 D1/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L 01/08/2018 01/08/2018 01/10/2018 D1/15/2018 EPA 6010 7439-95-4 Magnesium 4.81 mg/L	BGA0196-BS1		13-05605-000	Water						Calcium			
BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 30.5 mg/L 18A0093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 20.2 mg/L 18A0093-03 WUFF-OUT 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 21.5 mg/L 18A0093-03 Blank 13-05605-000 Water 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7440-70-2 Calcium 21.5 mg/L 01/10/2018 Blank 13-05605-000 Water 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 0.0500 U mg/L 01/10/2018 BGA0196-BS1 LCS 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 10.4 mg/L 01/08/2018 UVFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L 01/08/2010 UVFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L 01/08/2010 UVFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.81 mg/L	BGA0196-DUP1				01/08/2018	01/08/2018							
18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7440-70-2         Calcium         20.2         mg/L           18A0093-03         WUFF-OUT         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7440-70-2         Calcium         21.5         mg/L           BGA0196-BLK1         Blank         13-05605-000         Water         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         0.0500         U mg/L           BGA0196-BS1         LCS         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         10.4         mg/L           BGA0196-DUP1         WUFF-IN         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         4.80         mg/L           BGA0196-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         15.6         mg/L           18A0093-01	BGA0196-MS1												
18A0093-03         WUFF-OUT         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7440-70-2         Calcium         21.5         mg/L           BGA0196-BLK1         Blank         13-05605-000         Water         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         0.0500         U         mg/L           BGA0196-BS1         LCS         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         10.4         mg/L           BGA0196-DUP1         WUFF-IN         13-05605-000         Water         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         4.80         mg/L           BGA0196-MS1         WUFF-IN         13-05605-000         Water         01/08/2018         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         15.6         mg/L           18A0093-01         WUFF-IN         13-05605-000         Water         01/08/2018         01/08/2018         01/10/2018         01/15/2018         EPA 6010         7439-95-4         Magnesium         15.6         mg/L <td></td>													
BGA0196-BLK1 Blank 13-05605-000 Water 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 0.0500 U mg/L BGA0196-BS1 LCS 13-05605-000 Water 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 10.4 mg/L BGA0196-DUP1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.80 mg/L BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L 18A0093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.81 mg/L	18A0093-03												
BGA0196-BS1 LCS 13-05605-000 Water 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 10.4 mg/L BGA0196-DUP1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.80 mg/L BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L 18A0093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.81 mg/L	BGA0196-BLK1											U	
BGA0196-DUP1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.80 mg/L BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L 18A0093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.81 mg/L													
BGA0196-MS1 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 15.6 mg/L 18A0093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.81 mg/L					01/08/2018	01/08/2018							
18A0093-01 WUFF-IN 13-05605-000 Water 01/08/2018 01/08/2018 01/10/2018 01/15/2018 EPA 6010 7439-95-4 Magnesium 4.81 mg/L													
	18A0093-03	WUFF-OUT								Magnesium	5.17		mg/L

## Data\_18A0093

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
BGA0317-BLK1	Blank	13-05605-000	Water			01/15/2018	01/16/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0317-BLK2	Blank	13-05605-000	Water			01/15/2018	01/16/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0353-BLK1	Blank	13-05605-000	Water			01/17/2018	01/17/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0353-BLK2	Blank	13-05605-000	Water			01/17/2018	01/17/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0080	U	mg-P/L
BGA0353-BS1	LCS	13-05605-000	Water			01/17/2018	01/17/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.306		mg-P/L
BGA0353-BS2	LCS	13-05605-000	Water			01/17/2018	01/17/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.310		mg-P/L
BGA0353-DUP1	WUFF-OUT	13-05605-000	Water	01/08/2018	01/08/2018	01/17/2018	01/17/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0420		mg-P/L
BGA0353-MS1	WUFF-OUT	13-05605-000	Water	01/08/2018	01/08/2018	01/17/2018	01/17/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.242		mg-P/L
18A0093-03RE1	WUFF-OUT	13-05605-000	Water	01/08/2018	01/08/2018	01/17/2018	01/17/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0480		mg-P/L
BGA0389-BLK1	Blank	13-05605-000	Water			01/18/2018	01/20/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0160	U	mg-P/L
BGA0389-BLK2	Blank	13-05605-000	Water			01/18/2018	01/20/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0160	U	mg-P/L
BGA0389-BS1	LCS	13-05605-000	Water			01/18/2018	01/20/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.294		mg-P/L
BGA0389-BS2	LCS	13-05605-000	Water			01/18/2018	01/20/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.298		mg-P/L
BGA0389-DUP1	WUFF-IN	13-05605-000	Water	01/08/2018	01/08/2018	01/18/2018	01/20/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0300		mg-P/L
BGA0389-MS2	WUFF-IN	13-05605-000	Water	01/08/2018	01/08/2018	01/18/2018	01/20/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.228		mg-P/L
18A0093-01RE1	WUFF-IN	13-05605-000	Water	01/08/2018	01/08/2018	01/18/2018	01/20/2018	SM 4500-F	7723-14-0	Total Phosphorus	0.0300		mg-P/L



24 January 2018

Dylan Ahearn Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle, WA 98121

RE: Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

Associated SDG ID(s)

18A0093

N/A



Digitally signed by Amanda
Volgardsen
DN: c=US, st=Washington,
I=Tukwila, o=Analytical
Resources, Inc., ou=Client
Services, cn=Amanda
Volgardsen,
email=amandav@arilabs.com
Date: 2018.01.24 16:45:35 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the reqirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it entirety.

ert# 100006 Acci

PJLA Testing
Accreditation # 66169



2200 Sixth Avenue | Suite 1100 Seattle, Washington | 98121 p 205 441 9080 | f 206 441 9108

## Chain of Custody Record

Project Name:	Projec	t Number:	Client:				-				Ar	alyses	Reques	ted				
Hydro International Up-flo Filter	13-0	5605-000	Herrera Envi	ronment	al		no constituent of	5		11								
Report To:			Copy To:				90	ratic		39							-	
Dylan Ahearn			desired formation of the second secon				254	cent	- sp	STA	6.3	63	108	œ			100	
Sampled By:			Delivery Metho	d: ,			SM	Con	sol	n - A	36	1 36	1234	200		9.0	and a line of the	
A. Svingel			COOLER	2/10	E		-spill	ent	Suspended solids -	outio	EPA	EP	3.58	EPA	200.8	A 200	9.	
Laboratory:		Requested C	ompletion Date:	Total No.		ners:	180	E	ads	strik	. Sn	87	OOB	p	PA	EP.	200	
Analytical Resources Inc.					2		nde	Se	Se	e D	pho	pho	3s C	Solv	=	pe/	EPA	
Lab Use:				Sample Type (see	Preser- vative?	Matrix (see	Total Suspended Solids- SM 2540D	Suspended Sediment Concentration - SMD3977	Total volatile S SM2540-E	Particle size Distribution - ASTM 3977	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	Hardness as CaCO3-SM 2340B	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved - EPA 200.8	Zinc, total - EPA 200.8	Lab ID No
Sample ID		Date	Time	codes)	(Y/N)	codes)	2	5.4	P SS						ပိ	Ż	Z	Lat
WUFF-IN 1/8	3/18 0437	1237	E 9647	C	N	SW	Х	X	×	Х	Х	Х	Х	X	X	Х	Х	
WUFF-OUT	3/18 0437 3/18 0422 X	HAH	2 delle	+ c	N	SW	x	X	Х	Х	Х	Х	Х	X	х	Х	X	
*	R	<b>P</b>																
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	The second secon																	
t and the second se	<del>/////////////////////////////////////</del>																	
Comments/Special Instructions:				1														<u></u>
Send 1 liter to ETS, Inc 975 Transpo	ort Way, Suite 2, Pet	aluma, CA	for PSD, TSS, a	nd TVSS.	PSD to	be run f	or >5	00, 50	0-125	, 125-	62.5,	62.5-4	, <4.					
Relinquished by (Name/CO/ ACC4 SVINDSKN / H2 (	iignature		Date/Time	304 Re	ceived By	(Name/CO	<u> </u>  _	1AR	1 5	ignatur	e O	. ī		0.0	A	Date/T	ime	304
	ignature	***************************************	Date/Time	Re	ceived By	(Name/CO	177		S	ignatur	e	ii I	17	44	1 1	Date/T	ime	
Sample Type: G=Grab C=Composite	Matrix Codes:	A=Air GW=(	Groundwater SE	-Sediment	SO=Soil	SW=Su	rface V	Vater	W=Wa	ter (bla	nks) f	V=Mati	erial (	)=Othe	r (speci	i(v)		

ifa. Flyden upffo EOC Composite Namele dock

Project Name





2200 Sixth Avenue | Suite 1100 Seattle, Washington | 98121 p 206 441 9080 | f 206 441 9108

## Chain of Custody Record

Project Name:	Proje	ct Number:	Client:								An	alyses I	Reques	ted				
Hydro International Up-flo Filt	er 13-0	5605-000	Herrera Envi	ronment	al		15.7	r.		11								
Report To:			Copy To:				8	ratio	l, iii	N 39					A.			
Dylan Ahearn							2540D	cent	ds.	ASTI	5.3	5.3	40B	80				
Sampled By: A. SVWDSW			Delivery Metho	d:	E		Solids- SM	Sediment Concentration	lded soli	ution - /	EPA 36	EPA 36	3-SM 23	EPA 200	200.8	- EPA 200.8	ω.	
Laboratory:		Requested C	ompletion Date:	Total No.	of Contair	ners:		ğ.	sper	strib	-sn	SI .	aco	- pa	PA:	EP.	200	
Analytical Resources Inc.					2		nde	Se	nS e	Se Di	pho	pho	as C	solv	a - E	ved	EPA	
Lab Use:				Sample Type (see	Preser- vative?	Matrix (see	Total Suspended	Suspended Sediment Concentra - SMD3977	al volatile 2540-E	Particle size Distribution - ASTM 3977	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	Hardness as CaCO3-SM 2340B	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved	Zinc, total - EPA 200.8	Lab ID No.
Sample I	D	Date	Time	codes)	(Y/N)	codes)	٩	NS 1	SN									La
WUFF-IN		1/7/	18 1641	С	N	SW	Х	Х	x	X	X	X	X	Χ	Χ	X	X	
WUFF-OUT		1/7/1	2 1916	С	N	SW	х	Х	Х	Х	Χ	Х	X	Χ	Х	Х	Х	
Comments/Special Instructions:																		
Send 1 liter to ETS, Inc 975 Tra	ansport Way, Suite 2, Pe	taluma, CA	for PSD, TSS, a	nd TVSS.	PSD to	be run f	or >5	00, 50	0-125	, 125-	62.5, (	52.5-4	, <4.					
Relinquished by (Name/CO/ Acht SVKNDS/W) / HEC	Signature		Date/Time	304 St	ceived By	(Name/CO	1	AR	1 5	ignatur Tepv ignatur	e 00 40	i. F	= 0	^0	٨	Date/T	ime (	304
Relinquished by (Name/CO/	Signature		Date/Time	Re	ceived By	(Name/CO	120	V	Š	ignatur	e		121	10		Date/T	ime	
the state of the s	0.				50.5.11		A	The section is										

Sample Type: G=Grab C=Composite

Matrix Codes: A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)



Printed: 1/8/2018 3:27:59PM

#### WORK ORDER

-1	OA	1	$\alpha$	1
- 1	V	1 11		1
- 1	8A	111	17	1

Client: Herrera Environmental Consultants Project Manager: Amanda Volgardsen

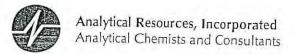
Project: Hydro International Project Number: 13-05605-000

#### **Preservation Confirmation**

Container ID	Container Type	рН
18A0093-01 A	Large OJ, 1000 mL	
18A0093-01 B	Large OJ, 1000 mL	
18A0093-01 C	Large OJ, 1000 mL	
18A0093-01 D	Small OJ, 500 mL	
18A0093-01 E	Small OJ, 500 mL, 9N H2SO4	LZ DAR
18A0093-01 F	HDPE NM, 500 mL, 1:1 HNO3	62 pass
18A0093-02 A	HDPE NM, 500 mL	72 fai1
18A0093-03 A	Large OJ, 1000 mL	
18A0093-03 B	Large OJ, 1000 mL	
18A0093-03 C	Large OJ, 1000 mL	
18A0093-03 D	Small OJ, 500 mL	
18A0093-03 E	Small OJ, 500 mL, 9N H2SO4	LZ pags
18A0093-03 F	HDPE NM, 500 mL, 1:1 HNO3	LZ pass
18A0093-04 A	HDPE NM, 500 mL	>2 fail

Preservation Confirmed By

1/8/18 Date



# Cooler Receipt Form

ARI Client: Hervero		Project Name: Hydro	Late						
COC No(s):	NA NA	1110	Interna	V					
Assigned ARI Job No: 16 A 00	92	Delivered by: Fed-Ex UPS Cour	rier Hand Delivere	Other:					
Preliminary Examination Phase:	1)	Tracking No:		(NA)					
Were intact, properly signed and dated			YE	s No					
Were custody papers included with the			YE	S NO					
Were custody papers properly filled ou	ıt (ink, signed, etc.)		YE.	NO NO					
Temperature of Cooler(s) (°C) (recommended)	mended 2.0-6.0 °C for chen	nistry) 4,8							
If cooler temperature is out of complian	nce fill out form 00070F	<del></del>	Temp Gun ID#:	Ton ac					
Cooler Accepted by:	Œ	21/21/01	12/1	101361					
	Complete custody forms	Date: Time: and attach all shipping documents							
Log-In Phase:	ompiete dustody forms a	nu attach all snipping documents							
IM-									
Was a temperature blank included in the	ne cooler?			YES NO					
What kind of packing material was us	sed? Bubble Wrap	Wet Ice Gel Packs Baggies Foam I	Block Paper Othe	er: None					
vvas sumicient ice used (if appropriate)	?	************		YES NO					
vvere all bottles sealed in individual plastic bags?									
Did all bottles arrive in good condition (	unbroken)?	······································	- 5	YES NO					
Were all bottle labels complete and legible?  Did the number of containers listed on COC match with the number of containers received?									
Did all bottle labels and the second	COC match with the number	er of containers received?		YES NO					
Did all bottle labels and tags agree with custody papers?  Were all bottles used correct for the requested analyses?									
Do say of the analyses (hettles) service	quested analyses?		(	YES NO					
Do any of the analyses (bottles) require	preservation? (attach pres	servation sheet, excluding VOCs)	NA	YES NO					
Were all VOC vials free of air bubbles?		TOTO VICTORIA STATE AND A STATE OF THE STATE	CNA	YES NO					
Was sufficient amount of sample sent in	1 each pottle?		· ·	YES NO					
Date VOC Trip Blank was made at ARI Was Sample Split by ARI : JF NA	60 5 = 110	11	NA)	000					
TVas Carriple Opin by AIXI	Date/Time:	2/18 Equipment: Chun	7 Spittes	olit by: 1 P					
Samples Logged by:	S P Date:	1/8/10 - 1	50 -	7					
	* Notify Project Manager	of discrepancies or concerns **	01/-6						
	, , , , , , , , , , , , , , , , , , ,	or discrepancies or concerns **							
Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle							
		Cample ID on Bottle	Sample I	D on COC					
	No.								
Additional Notes, Discrepancies, & R	esolutions:								
		-							
the state of the s									
				- market a translate					
By: Date:		1							
Small Air Bubbles Pesbubbles'	LARGE Air Butbles S	Small → "sm" (<2 mm)							
=2mm 2-4 mm	Management of the control of the con	Peabubbles -> "pb" ( 2 to < 4 mm)							
· · · · • • • •		_arge → "lg" (4 to < 6 mm)							
		Headspace → "hs" (>6 mm)							

0016F 3/2/10

Cooler Receipt Form

Revision 014



2200 Sixth Avenue | Suite 1100

Seattle, Washington | 98121 100000 Chain of Custody Docord

			Number:	Client:			Analyses Requested												
			05605-000	Herrera Envi	vironmental		00	ration		1 3977									
Report To:	Market	Copy To:		on a little of the little of t															
Dylan Ahearn							254	Suspended Sediment Concentration - SMD3977 Total volatile Suspended solids - SM2540-E	ds.	181	5.3	5.3	108	60					
Sampled By: A. Svingel				Delivery Method:			Solids - SM 2540D		oution - A	EPA 36	EPA 36	3-SM 23	EPA 200	8.00	A 200.8	60			
Laboratory:					Total No. of Containers:		85	E	E ed	e Distrik	shorus -	shorus -	s caco	olved -	- EPA	ed - EP,	- EPA 200.8		
Analytical Resources Inc.			2		dec	Sus	PA												
Lab Use:				Acceptance of the second	Sample Type (see	Preser-	Matrix (see	Total Suspended	spended	al volatile 2540-E	Particle size Distribution - ASTM	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	Hardness as CaCO3-SM 2340B	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved - EPA 200.8	Zinc, total - £	Lab ID No
Sample ID			Date	Time	codes)	(Y/N)	codes)	70	15 1	SR	1					ပိ	Zir	Ž,	La
	3/18	0437	1831	E 9691	C	N	SW	X	X	X	Χ	X	X	Х	X	X	Х	X	
WUFF-OUT	e/18	0422	State	edette	y C	N	SW	X	X	Х	Х	Х	Х	Х	X	Х	X	X	
													d territorio de la companya de la co						
and the second section of the sectio				- Constitution of the Cons															
Comments/Special Instructions:  Send 1 liter to ETS, Inc 975 Transport Relinquished by (Name/CO/ ACA SVAJOSIA) / H2	ort Way, Signature	Suite 2, Pet	aluma, CA	for PSD, TSS, a	Re	ceived By	(Name/CO	)]	An.	) 5	ignatur	e	62.5-4		^0	λ	Date/1		304
Relinquished by (Name/CO/ Signature			Date/Time Received By (Name/CO			))		S	ignatur	6	1		-		Date/T	ime			

Sample Type: G=Grab C=Composite

Matrix Codes: A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)





## ETS

#### Environmental Technical Services

-Soil, Water & Air Testing & Monitoring -Analytical Labs

-Technical Support

975 Transport Way, Suite 2 Petaluma, CA 94954 (707) 778-9605/FAX 778-9612

Serving people and the environment so that both benefit.

e-mail: entech@pacbell.net

COMPANY:	Analytical Resources, Inc., 4611 S. 134th Place, Suite	100, Tukwila, W	/A 98168		ANALYST(S)	SUPERVISOR
ATTN:	Amanda Volgardsen	DATE	DATE	DATE	S. Santos	D. Jacobson
JOB:	Hydro International Up-Flo Filter	COLLECTED	RECEIVED	COMPLETED	L. Quijano	LAB DIRECTOR
SITE:	Oregon-Washington	1/8/2018	1/10/2018	1/22/2018		G.S. Conrad,PhD
7	PARTICLE SIZE DISTRIBUTION (DSD) TS					1

	RIICLE SIZE	DISTRIBUTI	ON (PSD), TS	S & TVSS AN	ALYSIS & R	EPORT - 5 P.	ART	
SAMPLE	SOURCE of WATER	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SOLIDS	SUSPENDED SEDIMENT CONC TSS mg/l
18A00	93-01	<b>0.2</b> 1.7%	<b>0.7</b> 5.8%	<b>0.5</b> 4.2%	Total SSC by	<b>2.7</b> 22.5% Summation →	<b>7.9</b> 65.8% <b>12.0</b>	13.5
	To be special to a second to	<b>0.0</b> 0.0%	<b>0.2</b> 2.5%	<b>0.3</b> 3.7%	Total SSC by	<b>2.2</b> 27.2% √ Summation →	5.4 66.7% 8.1	8.0
		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! Total SSC by	#DIV/0! y Summation →	#DIV/0! 0.0	
		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! Total SSC by	#DIV/0!	#DIV/0! 0.0	
SAMPLE ID	SOURCE of WATER	Water pH -log[H+]	ECw [Spec Cond] µS/cm	COLOR, TRUE PtCo Units	COLOR APPARENT PtCo Units	TOTAL IRON Fe (diss.) mg/l	SUSPENDED	VOLATILE ) SOLIDS (TVSS) mg/l
	The second secon						116	9.5
	The state of the s							5.0
	SAMPLE  ID  HI-51HEC/RW 18A00  HI-52HEC/RW 18A00  HI-51HEC/RW 18A00  HI-51HEC/RW	SAMPLE SOURCE of ID WATER  HI-51HEC/RW WUFF-IN 18A0093-01  HI-52HEC/RW WUFF-OUT 18A0093-03  SAMPLE SOURCE of	SAMPLE SOURCE SUSPENDED  of SOLIDS  ID WATER mg/l @ ≥500 µ  HI-51HEC/RW WUFF-IN 18A0093-01 1.7%  HI-52HEC/RW WUFF-OUT 18A0093-03 0.0%  #DIV/0!  #DIV/0!  SAMPLE SOURCE Water pH of ID WATER log[H+]  HI-51HEC/RW WUFF-IN 18A0093-01  HI-52HEC/RW WUFF-OUT	SAMPLE         SOURCE of solids         SUSPENDED SOLIDS SOLIDS SOLIDS mg/l @ ≥500 μ mg/l @ 125 μ           HI-51HEC/RW         WUFF-IN 18A0093-01         0.2 0.7 1.7% 5.8%           HI-52HEC/RW         WUFF-OUT 0.0 0.2 2.5%         0.2 0.5%           #DIV/0!         #DIV/0!         #DIV/0!           SAMPLE         SOURCE of Solid 1.0 WATER         Water pH Solid 1.0 PS/cm         ECW [Spec Cond] 1.0 PS/cm           HI-51HEC/RW         WUFF-IN 18A0093-01         HI-52HEC/RW         WUFF-OUT	SAMPLE         SOURCE of of SOLIDS         SUSPENDED SOLIDS         SUSPENDED SOLIDS         MIDS         MIDS <t< td=""><td>  SAMPLE   SOURCE   SUSPENDED   SUSPENDED   SUSPENDED   SUSPENDED   SOLIDS   SOLID</td><td>  SAMPLE   SOURCE   Of   SOLIDS   SOL</td><td>  Of WATER   SOLIDS   SOLIDS   SOLIDS   SOLIDS   SOLIDS   SOLIDS   Mg/l @ 2500 <math>\mu</math> mg/l @ 125 <math>\mu</math> mg/l @ 63 <math>\mu</math> mg/l @ 32 <math>\mu</math> mg/l @ 4 <math>\mu</math> mg/l @ 1 <math>\mu</math>   HI-51HEC/RW   WUFF-IN 18A0093-01   1.7%   5.8%   4.2%   22.5%   65.8%   Total SSC by Summation → 12.0   HI-52HEC/RW   WUFF-OUT   0.0   0.2   0.3   2.1   2.7   2.5%   66.7%   18A0093-03   2.5%   3.7%   27.2%   66.7%   18A0093-03   4DIV/0!   #DIV/0!   #DIV/0!  </td></t<>	SAMPLE   SOURCE   SUSPENDED   SUSPENDED   SUSPENDED   SUSPENDED   SOLIDS   SOLID	SAMPLE   SOURCE   Of   SOLIDS   SOL	Of WATER   SOLIDS   SOLIDS   SOLIDS   SOLIDS   SOLIDS   SOLIDS   Mg/l @ 2500 $\mu$ mg/l @ 125 $\mu$ mg/l @ 63 $\mu$ mg/l @ 32 $\mu$ mg/l @ 4 $\mu$ mg/l @ 1 $\mu$   HI-51HEC/RW   WUFF-IN 18A0093-01   1.7%   5.8%   4.2%   22.5%   65.8%   Total SSC by Summation → 12.0   HI-52HEC/RW   WUFF-OUT   0.0   0.2   0.3   2.1   2.7   2.5%   66.7%   18A0093-03   2.5%   3.7%   27.2%   66.7%   18A0093-03   4DIV/0!   #DIV/0!   #DIV/0!

#### COMMENTS

The matrix has a bordereline extremely low concentration of TSS particles amounting to ~11-14 ppm in the input sample; and the output sample is half to two-thirds that amount. The overall average reduction in TSS is more than a third at nearly 37%. The range is somewhat broad in this case at 32.5%-40.7% (TSS by summation vs TSS by analytical method). The reductions in each fraction are variable as follows: 100%, 71.4%, 40.0%, 18.5%, and 31.6%. The TVSS data show that the amount of volatiles calculates to an average of just under 75% in the input sample; and averages just over 62% in the output sample. This means that in both cases the majority of the suspended particulate matter is organic in nature; probably mostly leaf matter along with other vegetation debris, although anthropogenic materials, e.g. paper, polymer fibers, etc., may be a part of the overall mix of organics. The RPDs are both excellent as follows: ±5.9%; and ±0.6%.

\text{\text{NOTES: Tests were done according to methodology as per Association of Testing Materials (ASTM): Suspended Sediment Concentration – Modified ASTM D3977 (Practice for Determining Suspended-Sediment Concentration in Water Samples). Standard Methods is followed for the other tests: Color - 2120 C; Spec Cond. (ECw) - 2510 B; Iron - 3500-Fe B; pH - 4500-H+ B; TRPH - 5520 C.

Page 7 of 36 18A0093 ARISample FINAL 24 Jan 2018 1618



Herrera Environmental Consultants
Project: Hydro International

2200 6th Avenue, Suite 1100
Project Number: 13-05605-000
Reported:
Seattle WA, 98121
Project Manager: Dylan Ahearn
24-Jan-2018 16:18

#### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	18A0093-01	Water	08-Jan-2018 04:37	08-Jan-2018 13:04
WUFF-IN	18A0093-02	Water	08-Jan-2018 04:37	08-Jan-2018 13:04
WUFF-OUT	18A0093-03	Water	08-Jan-2018 04:22	08-Jan-2018 13:04
WUFF-OUT	18A0093-04	Water	08-Jan-2018 04:22	08-Jan-2018 13:04

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### Case Narrative

#### Sample receipt

Samples as listed on the preceding page were received January 8, 2018 under ARI workorder 18A0093. For details regarding sample receipt, please refer to the Cooler Receipt Form. The samples were split by sample receiving prior to analysis. The PSD and TSS analysis was subcontracted to ETS Labs. The SSC analysis was subcontracted to MTC.

#### Total and Dissolved Metals - EPA Method 200.8

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

#### Total Hardness - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### Wet Chemistry (O-Phos, T-Phos)

The samples were prepared and analyzed within the recommended holding times.

The method blanks were clean at the reporting limits.

The T-Phos LCS BGA0186 has low percent recoveries. The LCS was re-read to verify with similiar results. The samples and QC were reanalyzed with the LCS percent recovery within control limits. No further corrective action was taken.

An O-Phos matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recovery and duplicate RPD were within QC limits.

An T-Phos matrix spike and duplicate were prepared in conjunction with sample WUFF-OUT. The matrix spike percent recovery and duplicate RPD were within QC limits.

Analytical Resources, Inc.

#### Printed: 1/8/2018 3:27:59PM

#### WORK ORDER

18A0093	
IXAUII93	
10/100/5	

Client: Herrera Environmental Consultants

Project Manager: Amanda Volgardsen

**Project: Hydro International** 

Project Number: 13-05605-000

#### **Preservation Confirmation**

Container ID	Container Type	рН
18A0093-01 A	Large OJ, 1000 mL	
18A0093-01 B	Large OJ, 1000 mL	
18A0093-01 C	Large OJ, 1000 mL	
18A0093-01 D	Small OJ, 500 mL	
18A0093-01 E	Small OJ, 500 mL, 9N H2SO4	LZ Dage
18A0093-01 F	HDPE NM, 500 mL, 1:1 HNO3	62 pass
18A0093-02 A	HDPE NM, 500 mL	72 fai1
18A0093-03 A	Large OJ, 1000 mL	
18A0093-03 B	Large OJ, 1000 mL	
18A0093-03 C	Large OJ, 1000 mL	
18A0093-03 D	Small OJ, 500 mL	
18A0093-03 E	Small OJ, 500 mL, 9N H2SO4	LZ pass
18A0093-03 F	HDPE NM, 500 mL, 1:1 HNO3	LZ Dass
18A0093-04 A	HDPE NM, 500 mL	>2 fail

Preservation Confirmed By

1/8//8 Date



# Cooler Receipt Form

ARI Client: Herver	0_	Project Name: Hudco	Later	
COC No(s):		11,00	Interne	
Assigned ARI Job No: 18 A	00002 NA	Delivered by: Fed-Ex UPS Co	ourier Hand Delive	red Other:
Preliminary Examination Phase	00-1)	Tracking No:		(NA)
Were intact, properly signed and			Y	res (No)
Were custody papers included w			K	NO NO
Were custody papers properly fil	led out (ink, signed, etc.)		7	YES NO
emperature of Cooler(s) (°C) (rime:	ecommended 2.0-6.0 °C for che	emistry) 4 8	C	,,,,
f cooler temperature is out of co	mpliance fill out form 00070F	<u>""                                   </u>		Non - 5
	( -	1100 1		D002565
poler Accepted by:		Date: Tim		
og-In Phase:	Complete custody forms	and attach all shipping documents		
og-m Fnase.			:	
Was a temperature blank include	d in the cooler?			VEC A
What kind of packing material	vas used? Bubble Wra	p Wet Ice Gel Packs Baggies Foan	n Block Danas O:	YES NO
Vas sufficient ice used (if approp	riate)?	Can Dayyies Foat		
Vere all bottles sealed in individu	ual plastic bags?		NA	YES NO
id all bottles arrive in good cond	lition (unbroken)?			YES NO
ere all bottle labels complete a	nd legible?			YES NO
id the number of containers list	ed on COC match with the num	ber of containers received?		YES NO
id all bottle labels and tags agre	e with custody papers?	ber of containers received?		YES NO
ere all bottles used correct for t	he requested analyses?	······································		YES NO
o any of the analyses (bottles) r	equire preservation? (attach pr	eservation sheet, excluding VOCs)	7.5	YES NO
ere all VOC vials free of air bub	bles?	eservation sheet, excluding VOCs)	NA	YES NO
as sufficient amount of sample	sent in each hottle?		NA	YES NO
ate VOC Trip Blank was made a	t ARI			YES NO
Vas Sample Split by ARI : JF NA	TO VES Date/Time: //	8118 Equipment: Chu	NA	-
4	Duter Time.	Equipment: C/(	n Spitte	Split by:
mples Logged by:	Date	: 1/8/18 Time:	150	7
		er of discrepancies or concerns **	10-2	
The state of the s		The second of th		
Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle		
		Cample ID on Bottle	Sample	e ID on COC
	T.			
dditional Notes, Discrepancies	, & Resolutions:			
	20 Year old 14 20 Tay 19 8 70 Tay			
7: Date	e:			
Small Air Bubbles Pesbubble	-1	Small → "sm" (<2 mm)		
-2mm 2-4 mm		Peabubbles $\rightarrow$ "pb" (2 to < 4 mm)		
	0 0 0 0 0	Large > "lg" (4 to < 6 mm)	*	
0 0				
		Headspace → "hs" (>6 mm)		

0016F 3/2/10

Cooler Receipt Form

Revision 014



## Chain of Custody Record

Project Name:	Proje	ct Number:	CI	lient:								Ar	alyses	Reques	ted				
Hydro International Up-flo Filte	r 13-0	5605-000	Н	errera Envi	ronment	al			5		12							1 = 1	
Report To:			C	ору То:				9	ratic		N 39								
Dylan Ahearn			11:					254	cent	- sp	ASTA	5.3	5.3	40B	œ				
Sampled By:			D	elivery Method	d: ,			SM	S	soli	1-0	1 36	4 36	A 23	200	_	8.0		
A. SVENDER			C	oourn (	2/10	E		-spile	ent	papu	butio	- EP/	- EP/	3-SI	EPA	200.8	A 20	8.0	
Laboratory:		Requested (	Comp	oletion Date:	Total No.		ners:	d Sc	di	sbe	istri	snus	suz	acc	- pa	PA	m.	1 200	
Analytical Resources Inc.					8*	2		ande	d Se	e Su	ze D	ohds	spho	as C	solv	<u>=</u>	ved	EP/	
Lab Use:					Sample Type (see		Matrix (see	Total Suspended Solids- SM 2540D	swD3977	Total volatile Suspended solids - SM2540-E	Particle size Distribution - ASTM 3977	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	Hardness as CaCO3-SM 2340B	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved - EPA 200.8	Zinc, total - EPA 200.8	Lab ID No.
Sample ID		Date		Time	codes)	(Y/N)	codes)	F	0.00	SS			120						E
WUFF-IN			18	1641	С	N	SW	Х	X	х	X	Χ	Χ	Χ	Х	X	X	X	
WUFF-OUT		1/71	18	1916	С	N	SW	х	X	Х	Х	Х	X	X	Х	X	X	Х	
		1 3																	
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Comments/Special Instructions:																			
Send 1 liter to ETS, Inc 975 Train	nsport Way, Suite 2, Pe	taluma, CA	for	PSD, TSS, a	nd TVSS.	PSD to	be run f	for >5	00, 50	0-125	, 125-	62.5,	62.5-4	4, <4.					
Relinquished by (Name/CO/ Acht Sviewosla) / HEC	Signature			Date/Time ( /を / を し Date/Time	304 Re	ceived By	(Name/CC	10	AR	1 /	Signatu	re	· 1		100	٨	Date/1	Time	1302
Relinquished by (Name/CO/	Signature			Date/Time	Re	ceived By	(Name/CC	0)		3	Signatu	re	100	17	VIC		Date/1	Time	
Sample Type: G=Grab C=Composite	Matrix Codes:	A=Air GW=	-Grou	undwater SE	=Sediment	SO=Soi	SW=Su	rface \	Water	W=Wa	ter (bla	nks) I	M=Mat	erial (	O=Othe	er (spec	cify)		

HERRERA

# Materials Testing & Consulting, Inc.



Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Hydro International (18A0093)	Date Received:	January 12, 2018
Project #:	16T001-035	Sampled By:	Others
Client :	Analytical Resources, Inc.	Date Reported:	January 24, 2018
Source:	Multiple	Tested By:	B. Goble
MTC Sample#:	Multiple		

#### CASE NARRATIVE

<ol> <li>Two samples were submitted for sediment concentration by ASTM D3977, Method C.</li> <li>The coarse material was screened over a No. 230 sieve.</li> <li>The suspended solids are reported in mg/L.</li> <li>The data is provided in a summary table.</li> <li>There were no other noted anomalies in this project.</li> </ol>	

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

 $\begin{tabular}{ll} \textbf{Regional Offices:} & Olympia \sim 360.534.9777 & Bellingham \sim 360.647.6111 & Silverdale \sim 360.698.6787 & Tukwila \sim 206.241.1974 \\ & & Visit our website: www.mtc-inc.net \\ \end{tabular}$ 

Page 13 of 36 18A0093 ARISample FINAL 24 Jan 2018 1618

# Page 14 of 36 18A0093 ARISample FINAL 24 Jan 2018 1618

# Materials Testing & Consulting, Inc.



Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

**Project:** Hydro International (18A0093) Project #: 16T001-035 Date Received: January 12, 2018

Date Tested: January 19, 2018

Sampled by: Others Tested by: B. Goble

Client: Analytical Resources, Inc.

#### Suspended Sediment Concentration ASTM D3977 Method C

Client Sample ID	MTC Sample ID	Sampling Date	Coarse Fraction SSC (>63µm) (mg/L)	FineFraction SSC (<63µm) (mg/L)	Total Suspended Sediment Concentration (mg/L)
WUFF-IN	S18-0041	1/8/2018	1.0	11.9	12.9
WUFF-OUT	S18-0042	1/8/2018	0.4	7.3	7.8

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

**Regional Offices:** Olympia ~ 360.534.9777

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

Bellingham ~ 360.647.6111

Silverdale ~ 360.698.6787

Tukwila ~ 206.241.1974

Visit our website: www.mtc-inc.net



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-IN 18A0093-01 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 200.8
 Sampled: 01/08/2018 04:37

 Instrument: ICPMS2
 Analyzed: 09-Jan-2018 16:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0172 Sample Size: 25 mL Prepared: 09-Jan-2018 Final Volume: 25 mL

Reporting Dilution Limit Analyte CAS Number Result Units Notes 7440-50-8 0.500 19.2 ug/L Copper Zinc 7440-66-6 1 4.00 64.8 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-IN 18A0093-01 (Water)

Metals and Metallic Compounds

 Method: EPA 6010C
 Sampled: 01/08/2018 04:37

 Instrument: ICP2
 Analyzed: 15-Jan-2018 16:20

7 Hidly 250. 15 July 2010 10.25

Sample Preparation: Preparation Method: TWC EPA 3010A

Preparation Batch: BGA0196 Sample Size: 25 mL Prepared: 10-Jan-2018 Final Volume: 25 mL

Reporting CAS Number Dilution Limit Units Analyte Result Notes Calcium 7440-70-2 0.0500 20.2 mg/L Magnesium 7439-95-4 1 0.0500 4.81 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-IN 18A0093-01 (Water)

**Wet Chemistry** 

 Method: SM 4500-P E-99
 Sampled: 01/08/2018 04:37

 Instrument: UV1800-2
 Analyzed: 09-Jan-2018 14:41

·

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0190 Sample Size: 50 mL Prepared: 09-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0080 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100 Project Number: 13-05605-000 Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 24-Jan-2018 16:18

#### **WUFF-IN** 18A0093-01 (Water)

Calculation

Sampled: 01/08/2018 04:37 Method: SM 2340 B-97 Instrument: [CALC] Analyzed: 15-Jan-2018 16:20

Sample Preparation: Preparation Method: [CALC] Preparation Batch: [CALC]

Prepared: 10-Jan-2018 Final Volume: 1

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Hardness		1	0.331	70.2	mg/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-IN 18A0093-01RE1 (Water)

**Wet Chemistry** 

Method: SM 4500-P E-99

Sampled: 01/08/2018 04:37
Instrument: UV1800-2

Analyzed: 20-Jan-2018 11:25

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid

Preparation Batch: BGA0389 Sample Size: 25 mL Prepared: 18-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0160 0.0300 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-IN 18A0093-02 (Water)

Metals and Metallic Compounds (dissolved)

 Method: EPA 200.8
 Sampled: 01/08/2018 04:37

 Instrument: ICPMS2
 Analyzed: 10-Jan-2018 14:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0174 Sample Size: 25 mL Prepared: 09-Jan-2018 Final Volume: 25 mL

Reporting Dilution Limit Analyte CAS Number Result Units Notes Copper, Dissolved 7440-50-8 0.500 9.88 ug/L Zinc, Dissolved 7440-66-6 1 4.00 36.1 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-OUT 18A0093-03 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 200.8
 Sampled: 01/08/2018 04:22

 Instrument: ICPMS2
 Analyzed: 09-Jan-2018 16:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0172 Sample Size: 25 mL Prepared: 09-Jan-2018 Final Volume: 25 mL

Reporting Dilution Limit Analyte CAS Number Result Units Notes 7440-50-8 0.500 18.2 ug/L Copper Zinc 7440-66-6 1 4.00 62.5 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-OUT 18A0093-03 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 6010C
 Sampled: 01/08/2018 04:22

 Instrument: ICP2
 Analyzed: 15-Jan-2018 15:10

Sample Preparation: Preparation Method: TWC EPA 3010A

Preparation Batch: BGA0196 Sample Size: 25 mL Prepared: 10-Jan-2018 Final Volume: 25 mL

Reporting CAS Number Dilution Limit Units Analyte Result Notes Calcium 7440-70-2 0.0500 21.5 mg/L Magnesium 7439-95-4 1 0.0500 5.17 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-OUT 18A0093-03 (Water)

**Wet Chemistry** 

 Method: SM 4500-P E-99
 Sampled: 01/08/2018 04:22

 Instrument: UV1800-2
 Analyzed: 09-Jan-2018 14:44

Thing 250. 07 but 2010 1111

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0190 Sample Size: 50 mL Prepared: 09-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0070 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100 Project Number: 13-05605-000 Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 24-Jan-2018 16:18

#### **WUFF-OUT** 18A0093-03 (Water)

Calculation

Sampled: 01/08/2018 04:22 Method: SM 2340 B-97 Instrument: [CALC] Analyzed: 15-Jan-2018 15:10

Sample Preparation: Preparation Method: [CALC] Preparation Batch: [CALC]

Prepared: 10-Jan-2018 Final Volume: 1

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Hardness		1	0.331	74.9	mg/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-OUT 18A0093-03RE1 (Water)

**Wet Chemistry** 

Method: SM 4500-P E-99

Instrument: UV1800-1

Analyzed: 17-Jan-2018 16:09

Sample Preparation: Preparation Method: SM 4500-P B-5 Persulfate

Preparation Batch: BGA0353 Sample Size: 25 mL Prepared: 17-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0080 0.0480 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### WUFF-OUT 18A0093-04 (Water)

Metals and Metallic Compounds (dissolved)

 Method: EPA 200.8
 Sampled: 01/08/2018 04:22

 Instrument: ICPMS2
 Analyzed: 10-Jan-2018 14:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0174 Sample Size: 25 mL Prepared: 09-Jan-2018 Final Volume: 25 mL

Reporting Dilution Limit Analyte CAS Number Result Units Notes Copper, Dissolved 7440-50-8 0.500 10.3 ug/L Zinc, Dissolved 7440-66-6 1 4.00 38.5 ug/L

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International Project Number: 13-05605-000

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### Metals and Metallic Compounds - Quality Control

#### Batch BGA0172 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0172-BLK1)				Prepa	ared: 09-Jan-	-2018 Ana	lyzed: 09-Ja	an-2018 12:	52		
Copper	63	ND	0.500	ug/L							U
Copper	65	ND	0.500	ug/L							U
Zinc	66	ND	4.00	ug/L							U
Zinc	67	ND	4.00	ug/L							U
LCS (BGA0172-BS1)				Prepa	ared: 09-Jan-	-2018 Ana	lyzed: 09-Ja	an-2018 13:	25		
Copper	63	26.5	0.500	ug/L	25.0	·	106	80-120			
Copper	65	26.2	0.500	ug/L	25.0		105	80-120			
Zinc	66	79.9	4.00	ug/L	80.0		99.8	80-120			
Zinc	67	76.5	4.00	ug/L	80.0		95.6	80-120			

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project Number: 13-05605-000 Project Manager: Dylan Ahearn **Reported:** 24-Jan-2018 16:18

#### Metals and Metallic Compounds - Quality Control

#### Batch BGA0196 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
QC Sumple/That'ye	Result	Ellilit	Cilita	Level	Result	70KEC	Limits	KI D	Limit	140103
Blank (BGA0196-BLK1)			Prepa	ared: 10-Jan-	-2018 Ana	lyzed: 15-J	an-2018 14:	22		
Calcium	ND	0.0500	mg/L							U
Magnesium	ND	0.0500	mg/L							U
LCS (BGA0196-BS1)			Prepa	ared: 10-Jan-	-2018 Ana	lyzed: 15-J	an-2018 14:	52		
Calcium	10.2	0.0500	mg/L	10.0		102	80-120			
Magnesium	10.4	0.0500	mg/L	10.0		104	80-120			
Duplicate (BGA0196-DUP1)	Source:	18A0093-01	Prepa	ared: 10-Jan-	-2018 Ana	lyzed: 15-J	an-2018 16:	16		
Calcium	20.3	0.0500	mg/L		20.2			0.26	20	
Magnesium	4.80	0.0500	mg/L		4.81			0.18	20	
Matrix Spike (BGA0196-MS1)	Source:	18A0093-01	Prepa	ared: 10-Jan-	-2018 Ana	lyzed: 15-J	an-2018 14:	48		
Calcium	30.5	0.0500	mg/L	10.0	20.2	103	75-125			
Magnesium	15.6	0.0500	mg/L	10.0	4.81	108	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### Metals and Metallic Compounds (dissolved) - Quality Control

#### Batch BGA0174 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0174-BLK1)				Prepa	ared: 09-Jan	2018 Ana	lyzed: 10-Ja	an-2018 13:	43		
Copper, Dissolved	63	ND	0.500	ug/L							U
Copper, Dissolved	65	ND	0.500	ug/L							U
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
LCS (BGA0174-BS1)				Prepa	ared: 09-Jan	-2018 Ana	lyzed: 10-Ja	an-2018 14:	24		
Copper, Dissolved	63	25.3	0.500	ug/L	25.0		101	80-120			
Copper, Dissolved	65	25.4	0.500	ug/L	25.0		102	80-120			
Zinc, Dissolved	66	75.2	4.00	ug/L	80.0		94.0	80-120			
Zinc, Dissolved	67	72.8	4.00	ug/L	80.0		91.0	80-120			

Analytical Resources, Inc.

Herrera Environmental Consultants 2200 6th Avenue, Suite 1100

Seattle WA, 98121

Project Number: 13-05605-000
Project Manager: Dylan Ahearn

**Reported:** 24-Jan-2018 16:18

#### **Wet Chemistry - Quality Control**

#### Batch BGA0186 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
QC Sample/Analyte	Result	Lillit	Omis	Level	Result	70KEC	Lillits	KLD	Liiiit	TVOICS
Blank (BGA0186-BLK1)			Prepa	red: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	21		
Total Phosphorus	ND	0.0160	mg-P/L							U
Blank (BGA0186-BLK2)			Prepa	red: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	41		
Total Phosphorus	ND	0.0160	mg-P/L							U
LCS (BGA0186-BS1)			Prepa	ared: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	22		
Total Phosphorus	0.250	0.0160	mg-P/L	0.300		83.3	90-110			*
LCS (BGA0186-BS2)			Prepa	red: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	36		
Total Phosphorus	0.254	0.0160	mg-P/L	0.300		84.7	90-110			*
LCS (BGA0186-BS3)			Prepa	ared: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	42		
Total Phosphorus	0.254	0.0160	mg-P/L	0.300		84.7	90-110			*

Analytical Resources, Inc.

Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Project: Hydro International Project Number: 13-05605-000 Project Manager: Dylan Ahearn

Seattle WA, 98121

**Reported:** 24-Jan-2018 16:18

#### **Wet Chemistry - Quality Control**

#### Batch BGA0190 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: RLM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ç,										
Blank (BGA0190-BLK1)			Prepa	red: 09-Jan-	-2018 Ana	lyzed: 09-J	an-2018 14:	40		
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BGA0190-BS1)			Prepa	red: 09-Jan-	-2018 Ana	lyzed: 09-J	an-2018 14:	40		
Orthophosphorus	0.153	0.0040	mg-P/L	0.150		102	90-110			
Duplicate (BGA0190-DUP1)	Source:	18A0093-01	Prepa	red: 09-Jan-	-2018 Ana	lyzed: 09-J	an-2018 14:	42		
Orthophosphorus	0.0080	0.0040	mg-P/L		0.0080			0.00		
Matrix Spike (BGA0190-MS1)	Source:	18A0093-01	Prepa	red: 09-Jan-	-2018 Ana	lyzed: 09-J	an-2018 14:	43		
Orthophosphorus	0.107	0.0040	mg-P/L	0.0999	0.0080	99.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### **Wet Chemistry - Quality Control**

#### Batch BGA0317 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-1 Analyst: RLM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0317-BLK1)			Prepa	ared: 15-Jan-	-2018 Ana	lyzed: 16-Ja	an-2018 14:	:35		
Total Phosphorus	ND	0.0080	mg-P/L							U
Blank (BGA0317-BLK2)			Prepa	ared: 15-Jan-	-2018 Ana	lyzed: 16-Ja	an-2018 14	43		
Total Phosphorus	ND	0.0080	mg-P/L							U

Analytical Resources, Inc.



Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Project: Hydro International Project Number: 13-05605-000

Seattle WA, 98121

**Reported:** 24-Jan-2018 16:18

#### **Wet Chemistry - Quality Control**

Project Manager: Dylan Ahearn

#### Batch BGA0353 - SM 4500-P B-5 Persulfate

Instrument: UV1800-1 Analyst: RLM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0353-BLK1)			Prepa	ared: 17-Jan-	-2018 Ana	lyzed: 17-J	Jan-2018 16:	08		
Total Phosphorus	ND	0.0080	mg-P/L							U
Blank (BGA0353-BLK2)			Prepa	ared: 17-Jan-	-2018 Ana	lyzed: 17-J	Jan-2018 16:	13		
Total Phosphorus	ND	0.0080	mg-P/L							U
LCS (BGA0353-BS1)			Prepa	ared: 17-Jan-	-2018 Ana	lyzed: 17-J	Jan-2018 16:	09		
Total Phosphorus	0.306	0.0080	mg-P/L	0.300		102	90-110			
LCS (BGA0353-BS2)			Prepa	ared: 17-Jan-	-2018 Ana	lyzed: 17-J	Jan-2018 16:	13		
Total Phosphorus	0.310	0.0080	mg-P/L	0.300		103	90-110			
Duplicate (BGA0353-DUP1)	Source	18A0093-03RE	1 Prepa	ared: 17-Jan-	-2018 Ana	lyzed: 17-J	Jan-2018 16:	10		
Total Phosphorus	0.0420	0.0080	mg-P/L		0.0480			13.30	20	
Matrix Spike (BGA0353-MS1)	Source	18A0093-03RE	1 Prepa	ared: 17-Jan-	-2018 Ana	lyzed: 17-J	Jan-2018 16:	10		
Total Phosphorus	0.242	0.0080	mg-P/L	0.200	0.0480	97.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.

Herrera Environmental Consultants Project: Hydro International 2200 6th Avenue, Suite 1100 Project Number: 13-05605-000

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### **Wet Chemistry - Quality Control**

#### Batch BGA0389 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0389-BLK1)			Prepa	red: 18-Jan	-2018 Ana	lyzed: 20-J	an-2018 11:	24		
Total Phosphorus	ND	0.0160	mg-P/L							U
Blank (BGA0389-BLK2)			Prepa	red: 18-Jan	-2018 Ana	lyzed: 20-J	an-2018 11:	38		
Total Phosphorus	ND	0.0160	mg-P/L							U
LCS (BGA0389-BS1)			Prepa	red: 18-Jan	-2018 Ana	lyzed: 20-J	an-2018 11:	24		
Total Phosphorus	0.294	0.0160	mg-P/L	0.300		98.0	90-110			
LCS (BGA0389-BS2)			Prepa	red: 18-Jan	-2018 Ana	lyzed: 20-J	an-2018 11:	38		
Total Phosphorus	0.298	0.0160	mg-P/L	0.300		99.3	90-110			
Duplicate (BGA0389-DUP1)	Source:	18A0093-01RE	1 Prepa	red: 18-Jan	-2018 Ana	lyzed: 20-J	an-2018 11:	25		
Total Phosphorus	0.0300	0.0160	mg-P/L		0.0300			0.00		
Matrix Spike (BGA0389-MS2)	Source:	18A0093-01RE	1 Prepa	red: 18-Jan	-2018 Ana	lyzed: 20-J	an-2018 11:	37		
Total Phosphorus	0.228	0.0160	mg-P/L	0.200	0.0300	99.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International
2200 6th Avenue, Suite 1100

Project Number: 13-05605-000

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### **Certified Analyses included in this Report**

Analyte	Certifications
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EPA 200.8 in Water	
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP

EPA 6010C in Water

Calcium WADOE,NELAP,DoD-ELAP
Magnesium WADOE,NELAP,DoD-ELAP

SM 4500-P E-99 in Water

Orthophosphorus WADOE,NELAP
Total Phosphorus WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:18

#### **Notes and Definitions**

U	This analyte is not detected above the applicable reporting or detection limit.
---	---

J Estimated concentration value detected below the reporting limit.

D The reported value is from a dilution

\* Flagged value is not within established control limits.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

[2C] Indicates this result was quantified on the second column on a dual column analysis.

## **January 8, 2018**

## Data\_18A0109

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
18A0109-01	WUFF-IN	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/10/2018	01/15/2018	SM 2340 B-97		Hardness	39.2		mg/L
18A0109-03	WUFF-OUT	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/10/2018	01/15/2018	SM 2340 B-97		Hardness	51.5		mg/L
BGA0186-BLK1	Blank	13-05605-000	Water			01/10/2018	01/11/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0160	U	mg-P/L
BGA0186-BLK2	Blank	13-05605-000	Water			01/10/2018	01/11/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0160	U	mg-P/L
BGA0186-BS1	LCS	13-05605-000	Water			01/10/2018	01/11/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.250	*	mg-P/L
BGA0186-BS2	LCS	13-05605-000				01/10/2018	01/11/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.254	*	mg-P/L
BGA0186-BS3	LCS	13-05605-000						SM 4500-P E-99	7723-14-0	Total Phosphorus	0.254	*	mg-P/L
BGA0193-BLK1	Blank	13-05605-000						SM 4500-P E-99	1426-54-42	<u> </u>	0.0040	U	mg-P/L
BGA0193-BS1	LCS	13-05605-000						SM 4500-P E-99		Orthophosphorus	0.152		mg-P/L
	WUFF-IN		Surface Water	01/09/2018	01/09/2018			SM 4500-P E-99		Orthophosphorus	0.0050		mg-P/L
	WUFF-IN		Surface Water					SM 4500-P E-99		Orthophosphorus	0.104		mg-P/L
	WUFF-IN		Surface Water					SM 4500-P E-99		Orthophosphorus	0.0050		mg-P/L
	WUFF-OUT		Surface Water					SM 4500-P E-99		Orthophosphorus	0.0070		mg-P/L
	Blank	13-05605-000		01/00/2010	01/00/2010		01/10/2018		7440-50-8	Copper	0.500	U	ug/L
BGA0195-BS1	LCS	13-05605-000					01/10/2018		7440-50-8	Copper	26.5		ug/L
	WUFF-OUT		Surface Water	01/09/2018	01/09/2018		01/10/2018		7440-50-8	Copper	21.1		ug/L
	WUFF-OUT		Surface Water				01/10/2018		7440-50-8	Copper	47.6		ug/L
	WUFF-IN		Surface Water				01/10/2018		7440-50-8	Copper	21.4		ug/L
	WUFF-OUT		Surface Water				01/10/2018		7440-50-8	Copper	18.3		ug/L
	Blank	13-05605-000		01/03/2010	01/03/2010		01/10/2018		7440-50-8	Copper	0.500	U	
BGA0195-BS1	LCS	13-05605-000					01/10/2018		7440-50-8	Copper	26.6	U	ug/L ug/L
BGA0195-BLK1	Blank	13-05605-000					01/10/2018		7440-50-6	Zinc	4.00	U	
BGA0195-BS1	LCS	13-05605-000					01/10/2018		7440-66-6	Zinc	82.4	U	ug/L
	WUFF-OUT			04/00/2019	04/00/2019								ug/L
			Surface Water				01/10/2018		7440-66-6	Zinc	66.7		ug/L
	WUFF-OUT		Surface Water				01/10/2018		7440-66-6	Zinc	144		ug/L
	WUFF-IN		Surface Water				01/10/2018		7440-66-6	Zinc	66.2		ug/L
18A0109-03	WUFF-OUT		Surface Water	01/09/2018	01/09/2018		01/10/2018		7440-66-6	Zinc	60.7		ug/L
	Blank	13-05605-000					01/10/2018		7440-66-6	Zinc	4.00	U	ug/L
BGA0195-BS1	LCS	13-05605-000					01/10/2018		7440-66-6	Zinc	78.9		ug/L
BGA0196-BLK1	Blank	13-05605-000					01/15/2018		7440-70-2	Calcium	0.0500	U	mg/L
BGA0196-BS1	LCS	13-05605-000					01/15/2018		7440-70-2	Calcium	10.2		mg/L
	WUFF-IN		Surface Water				01/15/2018		7440-70-2	Calcium	11.9		mg/L
	WUFF-OUT		Surface Water	01/09/2018	01/09/2018		01/15/2018		7440-70-2	Calcium	15.0		mg/L
BGA0196-BLK1	Blank	13-05605-000					01/15/2018		7439-95-4	Magnesium	0.0500	U	mg/L
BGA0196-BS1	LCS	13-05605-000					01/15/2018		7439-95-4	Magnesium	10.4		mg/L
	WUFF-IN		Surface Water				01/15/2018		7439-95-4	Magnesium	2.33		mg/L
			Surface Water	01/09/2018	01/09/2018			EPA 6010C	7439-95-4	Magnesium	3.43		mg/L
	Blank	13-05605-000						EPA 200.8-Dissolved		Copper	0.500	U	ug/L
BGA0264-BS1	LCS	13-05605-000						EPA 200.8-Dissolved	7440-50-8	Copper	27.7		ug/L
	WUFF-IN		Surface Water					EPA 200.8-Dissolved	7440-50-8	Copper	8.35		ug/L
BGA0264-MS1	WUFF-IN		Surface Water	01/09/2018	01/09/2018	01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-50-8	Copper	35.1		ug/L
18A0109-02	WUFF-IN	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-50-8	Copper	8.28		ug/L
18A0109-04	WUFF-OUT	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-50-8	Copper	8.48		ug/L
	Blank	13-05605-000	Water					EPA 200.8-Dissolved	7440-50-8	Copper	0.500	U	ug/L
BGA0264-BS1	LCS	13-05605-000	Water			01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-50-8	Copper	27.4		ug/L
BGA0264-BLK1	Blank	13-05605-000	Water			01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BGA0264-BS1	LCS	13-05605-000	Water			01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	112		ug/L
BGA0264-DUP1	WUFF-IN	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	28.3		ug/L
BGA0264-MS1	WUFF-IN	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	106		ug/L

## Data\_18A0109

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
18A0109-02	WUFF-IN	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	28.2		ug/L
18A0109-04	WUFF-OUT	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	30.0		ug/L
BGA0264-BLK1	Blank	13-05605-000	Water			01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	4.00	U	ug/L
BGA0264-BS1	LCS	13-05605-000	Water			01/12/2018	01/12/2018	EPA 200.8-Dissolved	7440-66-6	Zinc	102		ug/L
BGA0389-BLK1	Blank	13-05605-000	Water			01/18/2018	01/20/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0160	U	mg-P/L
BGA0389-BLK2	Blank	13-05605-000	Water			01/18/2018	01/20/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0160	U	mg-P/L
BGA0389-BS1	LCS	13-05605-000	Water			01/18/2018	01/20/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.294		mg-P/L
BGA0389-BS2	LCS	13-05605-000	Water			01/18/2018	01/20/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.298		mg-P/L
18A0109-01RE1	WUFF-IN	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/18/2018	01/20/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0380		mg-P/L
18A0109-03RE1	WUFF-OUT	13-05605-000	Surface Water	01/09/2018	01/09/2018	01/18/2018	01/20/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0340		mg-P/L



24 January 2018

Dylan Ahearn Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle, WA 98121

**RE:** Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

Associated SDG ID(s)

18A0109



Digitally signed by Amanda Volgardsen DN: c=US, st=Washington, Services, cn=Amanda Volgardsen, email=amandav@arilabs.com

Date: 2018.01.24 16:12:20 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the regirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in it-

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2200 Sixth Avenue | Suite 1100 Seattle, Washington | 98121 p 206 441 9080 | f 206 441 9108

## Chain of Custody Record

Project Name:	1 9080   f 206 441 9108   8AO 109 Project Number:   Client:																
Hydro International Up-flo Filter	13-05605-000	Herrera Envi	Herrera Environmental				5		1								
Report To:		Copy To:					ratic		1 397								
Dylan Ahearn						2540	cent	- sp	ASTA	5.3	5.3	40B	80				
Sampled By:			Delivery Method:				Con	- Switosin Total volatile Suspended solids - SM2540-E Particle size Distribution - ASTM 3977	istribution - A	Total phosphorus - EPA 365.3	4 36	11 23	200	· m	0.8	1	
A SVENDOW		IN COORED W/ICE				-spile	Suspended Sediment Concentration – SMD3977				- EP	13-SI	EPA	200.8	A 20	8.0	
aboratory:	Requested (	Completion Date: Total No. of Containers:		d Sc	rus	ırus				acc	- be	PA	Ģ.	1 200			
Analytical Resources Inc.		2			ande	G 92			pho	ohq	as C	solv	- E	ved	EPA		
.ab Use:			Sample Type (see	Preser- vative?	Matrix (see	Total Suspended Solids- SM 2540D	spender MD3977	al volatil 2540-E	article si	otal phos	Orthophosphorus - EPA 365.3	Hardness as CaCO3-SM 2340B	Copper, dissolved - EPA 200.8	Copper, total - EPA 200.8	Zinc, dissolved - EPA 200.8	Zinc, total - EPA 200.8	Lab ID No.
Sample ID	Date	Time	codes)	(Y/N)	codes)	To To	Sus -	SMS	<u>~</u>	ĭ	ō	Ï	3	8	Zin	Zin	Lab
WUFF-IN	1/9/18	0254	С	N	SW	×	X	x	X	Х	X	X	X	X	Χ	X	
WUFF-OUT	1/9/1	2 0258	C	N	SW	х	X	X	Х	Х	Χ	Х	X	Х	X	Х	
	1 (-																
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Comments/Special Instructions:			1														-
Send 1 liter to ETS, Inc 975 Transport Way	, Suite 2, Petaluma, CA	for PSD, TSS, a	nd TVSS.	PSD to	be run f	or >5	00, 50	00-125	, 125-	62.5,	62.5-4	1, <4.					
Relinquished by (Name/CO/ Signature	N	Date/Time			(Name/CC				ignatur					,	Date/T		
FISX SVENDEW / (LEC Men	- It	1/4/18 13	325 R	round	in Fick	14	FR1		1		1	W	-/	-	1/9,	118	13
		1/4/16 1305 Brandon Fish Date/Time Received By (Name/Co			)		Ś	Signature					Date/Time				

ample Type: G=Grab C=Composite

Matrix Codes: A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (spi





# ETS

### Environmental Technical Services

-Soil, Water & Air Testing & Monitoring

-Analytical Labs

-Technical Support

975 Transport Way, Suite 2
Petaluma, CA 94954
(707) 778-9605/FAX 778-9612
e-mail: entech@pacbell.net

Serving people and the environment so that both benefit.

			c., 4611 S. 134 <sup>tt</sup>	Place, Suite 1				ANALYST(S)	The second secon
JOB:	Amanda Vo Hydro Interr Oregon-Wa	national Up-Fl	o Filter		DATE COLLECTED 1/9/2018	DATE RECEIVED 1/11/2018	DATE COMPLETED 1/22/2018	S. Santos L. Quijano	D. Jacobson LAB DIRECTOR G.S. Conrad,PhD
	PA	RTICLE SIZI	E DISTRIBUTI	ON (PSD), TS	S & TVSS AN	IALYSIS & F	EPORT – 5 P	ART	
LAB SAMPLE NUMBER	SAMPLE ID	SOURCE of WATER	SUSPENDED SOLIDS mg/l @ ≥500 µ	SUSPENDED SOLIDS	SUSPENDED SOLIDS	SUSPENDED SOLIDS	SUSPENDED SOLIDS		SUSPENDED SEDIMENT CONC TSS mg/l
07619-1	HI-53HEC/RW 18A01		<b>0.5</b> 2.1%	<b>1.2</b> 5.2%	<b>0.5</b> 2.1%	Total SSC b	<b>9.7</b> 41.6% y Summation →	11.4 48.9% 23.3	23.0
07619-2	HI-54HEC/RW 18A01		<b>0.2</b> 1.2%	<b>0.7</b> 4.3%	<b>0.3</b> 1.9%	Total SSC b	<b>6.9</b> 42.9% y Summation →	8.0 49.7% 16.1	17.5
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! Total SSC b	#DIV/0! y Summation →	#DIV/0! 0.0	
			#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! Total SSC b	#DIV/0! y Summation →	#DIV/0! 0.0	
LAB SAMPLE NUMBER	SAMPLE	SOURCE of WATER	Water pH -log[H+]	ECw [Spec Cond] µS/cm	COLOR, TRUE PtCo Units	COLOR APPARENT PtCo Units	TOTAL IRON Fe (diss.) mg/l	SUSPENDED	VOLATILE O SOLIDS (TVSS) mg/l
07619-1	HI-53HEC/RW 18A01								11.5
07619-2	HI-54HEC/RW 18A01	WUFF-OUT 09-03							9.0

### COMMENTS

The matrix has a very low concentration of TSS particles amounting to ~20-25 ppm in the input sample; and the output sample is nearly three-quarters of that amount. The overall average reduction in TSS is only a little more than a quarter at over 27%. The range is somewhat broad in this case at 23.9%-30.9% (TSS by analytical method vs TSS by summation). The reductions in each fraction vary somewhat as follows: 60.0%, 41.7%, 40.0%, 28.9%, and 29.8%. The TVSS data show that the amount of volatiles calculates to an average of close to 50% in the input sample; and averages nearly 54% in the output sample. In this set, this means that in both cases right around half of the suspended particulate matter is organic in nature; probably mostly leaf matter along with other vegetation debris, although anthropogenic materials, e.g. paper, polymer fibers, etc., may be a part of the overall mix of organics. The RPDs are both excellent as follows: ±0.7%;and ±4.2%.

# Materials Testing & Consulting, Inc.



Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project: Hydro International (18A0109)	Date Received: January 12, 2018
<b>Project #:</b> 16T001-035	Sampled By: Others
Client: Analytical Resources, Inc.	Date Reported: January 24, 2018
Source: Multiple	Tested By: B. Goble
MTC Samplette Multiple	<del></del>

### **CASE NARRATIVE**

<ol> <li>Two samples were submitted for sediment concentration by ASTM D3977, Method C.</li> <li>The coarse material was screened over a No. 230 sieve.</li> <li>The suspended solids are reported in mg/L.</li> </ol>	
4. The data is provided in a summary table.	
5. There were no other noted anomalies in this project.	

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

 $\begin{tabular}{ll} \textbf{Regional Offices:} & Olympia \sim 360.534.9777 & Bellingham \sim 360.647.6111 & Silverdale \sim 360.698.6787 & Tukwila \sim 206.241.1974 \\ & & Visit our website: www.mtc-inc.net \\ \end{tabular}$ 

# Page 5 of 29 18A0109 ARISample FINAL 24 Jan 2018 1610

# Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

**Project:** Hydro International (18A0109) Project #: 16T001-035

Sampled by: Others Tested by: B. Goble

Client: Analytical Resources, Inc.

Date Received: January 12, 2018 Date Tested: January 19, 2018

### Suspended Sediment Concentration ASTM D3977 Method C

Client Sample ID	MTC Sample ID	Sampling Date	Coarse Fraction SSC (>63µm) (mg/L)	FineFraction SSC (<63µm) (mg/L)	Total Suspended Sediment Concentration (mg/L)
WUFF-IN	S18-0043	1/9/2018	9.7	12.9	22.5
WUFF-OUT	S18-0044	1/9/2018	8.7	9.0	17.7

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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Visit our website: www.mtc-inc.net

**Regional Offices:** Olympia ~ 360.534.9777



Herrera Environmental Consultants Project: Hydro International
2200 6th Avenue, Suite 1100 Project Number: 13-05605-000 Reported:
Seattle WA, 98121 Project Manager: Dylan Ahearn 24-Jan-2018 16:10

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	18A0109-01	Water	09-Jan-2018 02:54	09-Jan-2018 13:05
WUFF-IN	18A0109-02	Water	09-Jan-2018 02:54	09-Jan-2018 13:05
WUFF-OUT	18A0109-03	Water	09-Jan-2018 02:58	09-Jan-2018 13:05
WUFF-OUT	18A0109-04	Water	09-Jan-2018 02:58	09-Jan-2018 13:05

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 24-Jan-2018 16:10

### Case Narrative

### Sample receipt

Samples as listed on the preceding page were received January 9, 2018 under ARI workorder 18A0109. For details regarding sample receipt, please refer to the Cooler Receipt Form. The samples were split by sample receiving prior to analysis. The PSD and TSS analysis was subcontracted to ETS Labs. The SSC analysis was subcontracted to MTC.

### Total and Dissolved Metals - EPA Method 200.8

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

A total matrix spike and duplicate were prepared in conjunction with sample WUFF-OUT. The matrix spike percent recoveries and duplicate RPD were within QC limits.

A dissolved matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recoveries and duplicate RPD were within QC limits.

### Total Hardness - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

### Wet Chemistry (O-Phos, T-Phos)

The samples were prepared and analyzed within the recommended holding times.

The method blanks were clean at the reporting limits.

The T-Phos LCS BGA0186 has low percent recoveries. The LCS was re-read to verify with similiar results. The samples and QC were reanalyzed with the LCS percent recovery within control limits. No further corrective action was taken.

An O-Phos matrix spike and duplicate were prepared in conjunction with sample WUFF-IN. The matrix spike percent recovery and duplicate RPD were within QC limits.

Analytical Resources, Inc.

Printed: 1/9/2018 3:07:47PM

### WORK ORDER

18A0109

Client: Herrera Environmental Consultants

Project Manager: Amanda Volgardsen

Project: Hydro International

Project Number: 13-05605-000

### **Preservation Confirmation**

Container ID	Container Type	рН
18A0109-01 A	Large OJ, 1000 mL	
18A0109-01 B	Large OJ, 1000 mL	
18A0109-01 C	Large OJ, 1000 mL	
18A0109-01 D	Small OJ, 500 mL, 9N H2SO4	LZ Dags
18A0109-01 E	Small OJ, 500 mL	
18A0109-01 F	HDPE NM, 500 mL, 1:1 HNO3	LZ pag1
18A0109-02 A	HDPE NM, 500 mL	72 Farl
18A0109-03 A	Large OJ, 1000 mL	· · · · · · · · · · · · · · · · · · ·
18A0109-03 B	Large OJ, 1000 mL	
18A0109-03 C	Large OJ, 1000 mL	
18A0109-03 D	Small OJ, 500 mL, 9N H2SO4	LZ Dag1
18A0109-03 E	Small OJ, 500 mL	
18A0109-03 F	HDPE NM, 500 mL, 1:1 HNO3	LZ Dall
18A0109-04 A	HDPE NM, 500 mL	>2 fail

Preservation Confirmed By

Date



# **Cooler Receipt Form**

COC No(s):  Assigned ARI Job No:  Preliminary Examination Phase:  Were intact, properly signed and dated custody seals attached to the outside of to cooler?	
Assigned ARI Job No:	
Were intact, properly signed and dated custody seals attached to the outside of to cooler?	NA
	1/10
Were custody papers included with the cooler?	YES (NO)
Were custody papers properly filled out (ink, signed, etc.)	YES NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) Time:	(YES) NO
If cooler temperature is out of compliance fill out form 00070F  Temp Gun II	D#: D007565
Cooler Accepted by:	
Complete custody forms and attach all shipping documents	
Log-In Phase:	
Was a temperature blank included in the cooler?	YES NO
What kind of packing material was used? Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper	Other:
Was sufficient ice used (if appropriate)?  NA	YES NO
Were all bottles sealed in individual plastic bags?	YES (NO)
Did all bottles arrive in good condition (unbroken)?	YES NO
Were all bottle labels complete and legible?	YES NO
Did the number of containers listed on COC match with the number of containers received?	YES NO
Did all bottle labels and tags agree with custody papers?	YES NO
Were all bottles used correct for the requested analyses?	YES NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) NA	YES NO
Were all VOC vials free of air bubbles?	YES NO
Was sufficient amount of sample sent in each bottle?	YES NO
Date VOC Trip Blank was made at AR	NO NO
Was Sample Split by ARI: NA YES Date/Time: MI Equipment NUrn Splitter	Split by: SF BF
Samples Logged by:	
** Notify Project Manager of discrepancies or concerns **	
	-
Sample ID on Bottle Sample ID on COC Sample ID on Bottle Samp	ple ID on COC
Additional Notes, Discrepancies, & Resolutions:	
By: Date:	
Small Air Bubbles   Peebubbles'   LARGE Air Bubbles   Small → "sm" (<2 mm)	
=2mm 2-4 mm > 4 mm Peabubbles → "pb" (2 to < 4 mm)	
Large > "lg" (4 to < 6 mm)	
Headspace → "hs" (>6 mm)	

0016F 3/2/10

Cooler Receipt Form

Revision 014



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-IN 18A0109-01 (Water)

Metals and Metallic Compounds

 Method: EPA 200.8
 Sampled: 01/09/2018 02:54

 Instrument: ICPMS2
 Analyzed: 10-Jan-2018 13:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0195 Sample Size: 25 mL

Prepared: 10-Jan-2018 Final Volume: 25 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Copper	7440-50-8	1	0.500	21.4	ug/L	
Zinc	7440-66-6	1	4.00	66.2	ug/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-IN 18A0109-01 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 6010C
 Sampled: 01/09/2018 02:54

 Instrument: ICP2
 Analyzed: 15-Jan-2018 15:14

Sample Preparation: Preparation Method: TWC EPA 3010A

Preparation Batch: BGA0196 Sample Size: 25 mL Prepared: 10-Jan-2018 Final Volume: 25 mL

Reporting CAS Number Dilution Limit Units Analyte Result Notes Calcium 7440-70-2 0.0500 11.9 mg/L Magnesium 7439-95-4 1 0.0500 2.33 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-IN 18A0109-01 (Water)

**Wet Chemistry** 

Method: SM 4500-P E-99

Instrument: UV1800-2

Analyzed: 09-Jan-2018 16:22

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0193 Sample Size: 50 mL Prepared: 09-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0050 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100 Project Number: 13-05605-000 Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 24-Jan-2018 16:10

### **WUFF-IN** 18A0109-01 (Water)

Calculation

Sampled: 01/09/2018 02:54 Method: SM 2340 B-97 Instrument: [CALC]

Analyzed: 15-Jan-2018 15:14

Sample Preparation: Preparation Method: [CALC]

Preparation Batch: [CALC]

Prepared: 10-Jan-2018 Final Volume: 1

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Hardness		1	0.331	39.2	mg/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-IN 18A0109-01RE1 (Water)

**Wet Chemistry** 

 Method: SM 4500-P E-99
 Sampled: 01/09/2018 02:54

 Instrument: UV1800-2
 Analyzed: 20-Jan-2018 11:27

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid

Preparation Batch: BGA0389 Sample Size: 25 mL Prepared: 18-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0160 0.0380 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-IN 18A0109-02 (Water)

Metals and Metallic Compounds (dissolved)

 Method: EPA 200.8
 Sampled: 01/09/2018 02:54

 Instrument: ICPMS2
 Analyzed: 12-Jan-2018 15:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0264 Sample Size: 25 mL

Prepared: 12-Jan-2018 Final Volume: 25 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	8.28	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	28.2	ug/L	

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-OUT 18A0109-03 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 200.8
 Sampled: 01/09/2018 02:58

 Instrument: ICPMS2
 Analyzed: 10-Jan-2018 13:16

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0195 Sample Size: 25 mL

Prepared: 10-Jan-2018 Final Volume: 25 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Copper	7440-50-8	1	0.500	18.3	ug/L	
Zinc	7440-66-6	1	4.00	60.7	ug/L	

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Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-OUT 18A0109-03 (Water)

**Metals and Metallic Compounds** 

 Method: EPA 6010C
 Sampled: 01/09/2018 02:58

 Instrument: ICP2
 Analyzed: 15-Jan-2018 15:18

Sample Preparation: Preparation Method: TWC EPA 3010A

Preparation Batch: BGA0196 Sample Size: 25 mL Prepared: 10-Jan-2018 Final Volume: 25 mL

Reporting CAS Number Dilution Limit Units Analyte Result Notes Calcium 7440-70-2 0.0500 15.0 mg/L Magnesium 7439-95-4 1 0.0500 3.43 mg/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-OUT 18A0109-03 (Water)

**Wet Chemistry** 

 Method: SM 4500-P E-99
 Sampled: 01/09/2018 02:58

 Instrument: UV1800-2
 Analyzed: 09-Jan-2018 16:24

Sample Preparation: Preparation Method: No Prep Wet Chem

Preparation Batch: BGA0193 Sample Size: 50 mL Prepared: 09-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0070 mg-P/L

Analytical Resources, Inc.



mg/L

Herrera Environmental Consultants Project: Hydro International

Project Number: 13-05605-000 2200 6th Avenue, Suite 1100 Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 24-Jan-2018 16:10

### **WUFF-OUT** 18A0109-03 (Water)

Calculation

Sampled: 01/09/2018 02:58 Method: SM 2340 B-97 Instrument: [CALC] Analyzed: 15-Jan-2018 15:18

Sample Preparation: Preparation Method: [CALC] Preparation Batch: [CALC]

Prepared: 10-Jan-2018

Reporting CAS Number Dilution Limit Units Analyte Result Notes Hardness 0.331 51.5

Final Volume: 1

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Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-OUT 18A0109-03RE1 (Water)

**Wet Chemistry** 

 Method: SM 4500-P E-99
 Sampled: 01/09/2018 02:58

 Instrument: UV1800-2
 Analyzed: 20-Jan-2018 11:28

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid

Preparation Batch: BGA0389 Sample Size: 25 mL Prepared: 18-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0160 0.0340 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### WUFF-OUT 18A0109-04 (Water)

Metals and Metallic Compounds (dissolved)

 Method: EPA 200.8
 Sampled: 01/09/2018 02:58

 Instrument: ICPMS2
 Analyzed: 12-Jan-2018 15:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGA0264 Sample Size: 25 mL

Prepared: 12-Jan-2018 Final Volume: 25 mL

			Reporting			
Analyte	CAS Number	Dilution	Limit	Result	Units	Notes
Copper, Dissolved	7440-50-8	1	0.500	8.48	ug/L	
Zinc, Dissolved	7440-66-6	1	4.00	30.0	ug/L	

Analytical Resources, Inc.

Reported:



Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Project: Hydro International Project Number: 13-05605-000

Seattle WA, 98121

Project Manager: Dylan Ahearn 24-Jan-2018 16:10

### Metals and Metallic Compounds - Quality Control

### Batch BGA0195 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

			Reporting		Spike	Source		%REC		RPD	
QC Sample/Analyte	Isotope	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Blank (BGA0195-BLK1)				Prep	ared: 10-Jan	-2018 Ana	lyzed: 10-J	fan-2018 12:	:48		
Copper	63	ND	0.500	ug/L							U
Copper	65	ND	0.500	ug/L							U
Zinc	66	ND	4.00	ug/L							U
Zinc	67	ND	4.00	ug/L							U
LCS (BGA0195-BS1)				Prep	ared: 10-Jan	-2018 Ana	lyzed: 10-J	fan-2018 13:	25		
Copper	63	26.5	0.500	ug/L	25.0		106	80-120			
Copper	65	26.6	0.500	ug/L	25.0		106	80-120			
Zinc	66	82.4	4.00	ug/L	80.0		103	80-120			
Zinc	67	78.9	4.00	ug/L	80.0		98.7	80-120			
Duplicate (BGA0195-DUP1)		Source	: 18A0109-03	Prep	ared: 10-Jan	-2018 Ana	lyzed: 10-J	Jan-2018 13:	11		
Copper	63	21.1	0.500	ug/L		18.3			14.20	20	
Zinc	66	66.7	4.00	ug/L		60.7			9.39	20	
Matrix Spike (BGA0195-MS1	1)	Source	: 18A0109-03	Prep	ared: 10-Jan	-2018 Ana	lyzed: 10-J	Jan-2018 13:	20		
Copper	63	47.6	0.500	ug/L	25.0	18.3	117	75-125			
Zinc	66	144	4.00	ug/L	80.0	60.7	105	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.

Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### Metals and Metallic Compounds - Quality Control

### Batch BGA0196 - TWC EPA 3010A

Instrument: ICP2 Analyst: TCH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0196-BLK1)			Prepa	ared: 10-Jan-	-2018 Ana	lyzed: 15-J	an-2018 14:	22		
Calcium	ND	0.0500	mg/L							U
Magnesium	ND	0.0500	mg/L							U
LCS (BGA0196-BS1)			Prepa	ared: 10-Jan-	-2018 Ana	lyzed: 15-J	an-2018 14:	52		
Calcium	10.2	0.0500	mg/L	10.0		102	80-120			
Magnesium	10.4	0.0500	mg/L	10.0		104	80-120			

Analytical Resources, Inc.



Herrera Environmental Consultants

Project: Hydro International Project Number: 13-05605-000

2200 6th Avenue, Suite 1100 Seattle WA, 98121 Project Number: 13-05605-000 Reported:
Project Manager: Dylan Ahearn 24-Jan-2018 16:10

### Metals and Metallic Compounds (dissolved) - Quality Control

### Batch BGA0264 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: TCH

	_		Reporting		Spike	Source		%REC		RPD	
QC Sample/Analyte	Isotope	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes
Blank (BGA0264-BLK1)				Prep	ared: 12-Jan	-2018 Ana	lyzed: 12-J	an-2018 13:	:54		
Copper, Dissolved	63	ND	0.500	ug/L							U
Copper, Dissolved	65	ND	0.500	ug/L							U
Zinc, Dissolved	66	ND	4.00	ug/L							U
Zinc, Dissolved	67	ND	4.00	ug/L							U
LCS (BGA0264-BS1)				Prep	ared: 12-Jan	-2018 Ana	lyzed: 12-J	an-2018 15:	34		
Copper, Dissolved	63	27.7	0.500	ug/L	25.0		111	80-120			
Copper, Dissolved	65	27.4	0.500	ug/L	25.0		110	80-120			
Zinc, Dissolved	66	112	4.00	ug/L	80.0		140	80-120			
Zinc, Dissolved	67	102	4.00	ug/L	80.0		128	80-120			
Duplicate (BGA0264-DUP1)		Source	e: 18A0109-02	Prep	ared: 12-Jan	-2018 Ana	lyzed: 12-J	an-2018 15:	19		
Copper, Dissolved	63	8.35	0.500	ug/L		8.28			0.79	20	
Zinc, Dissolved	66	28.3	4.00	ug/L		28.2			0.30	20	
Matrix Spike (BGA0264-MS1)		Source	e: 18A0109-02	Prep	ared: 12-Jan	-2018 Ana	lyzed: 12-J	an-2018 15:	29		
Copper, Dissolved	63	35.1	0.500	ug/L	25.0	8.28	107	75-125		·	
Zinc, Dissolved	66	106	4.00	ug/L	80.0	28.2	97.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.

Herrera Environmental Consultants 2200 6th Avenue, Suite 1100

Project: Hydro International Project Number: 13-05605-000

Reported: Seattle WA, 98121 Project Manager: Dylan Ahearn 24-Jan-2018 16:10

### **Wet Chemistry - Quality Control**

### Batch BGA0186 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
QC Sample/Analyte	Result	Lillit	Omis	Level	Result	70KEC	Lillits	KLD	Liiiit	TVOICS
Blank (BGA0186-BLK1)			Prepa	red: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	21		
Total Phosphorus	ND	0.0160	mg-P/L							U
Blank (BGA0186-BLK2)			Prepa	red: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	41		
Total Phosphorus	ND	0.0160	mg-P/L							U
LCS (BGA0186-BS1)			Prepa	ared: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	22		
Total Phosphorus	0.250	0.0160	mg-P/L	0.300		83.3	90-110			*
LCS (BGA0186-BS2)			Prepa	red: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	36		
Total Phosphorus	0.254	0.0160	mg-P/L	0.300		84.7	90-110			*
LCS (BGA0186-BS3)			Prepa	ared: 10-Jan	-2018 Ana	lyzed: 11-J	an-2018 12:	42		
Total Phosphorus	0.254	0.0160	mg-P/L	0.300		84.7	90-110			*

Analytical Resources, Inc.

Herrera Environmental Consultants
Project: Hydro International
2200 6th Avenue, Suite 1100
Project Number: 13-05605-000

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### **Wet Chemistry - Quality Control**

### Batch BGA0193 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: RLM

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0193-BLK1)			Prepa	red: 09-Jan-	-2018 Ana	lyzed: 09-J	an-2018 16:	19		
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BGA0193-BS1)			Prepa	red: 09-Jan-	-2018 Ana	lyzed: 09-J	an-2018 16:	21		
Orthophosphorus	0.152	0.0040	mg-P/L	0.150		101	90-110			
Duplicate (BGA0193-DUP1)	Source:	18A0109-01	Prepa	red: 09-Jan-	-2018 Ana	lyzed: 09-J	an-2018 16:	22		
Orthophosphorus	0.0050	0.0040	mg-P/L		0.0050			0.00		
Matrix Spike (BGA0193-MS1)	Source:	18A0109-01	Prepa	red: 09-Jan-	-2018 Ana	lyzed: 09-J	an-2018 16:	23		
Orthophosphorus	0.104	0.0040	mg-P/L	0.0999	0.0050	99.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Analytical Resources, Inc.

Herrera Environmental Consultants

Project: Hydro International
2200 6th Avenue, Suite 1100

Project Number: 13-05605-000

2200 6th Avenue, Suite 1100Project Number:13-05605-000Reported:Seattle WA, 98121Project Manager:Dylan Ahearn24-Jan-2018 16:10

### Wet Chemistry - Quality Control

### Batch BGA0389 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: KK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0389-BLK1)			Prepa	red: 18-Jan	-2018 Ana	lyzed: 20-J	an-2018 11:	24		
Total Phosphorus	ND	0.0160	mg-P/L							U
Blank (BGA0389-BLK2)			Prepa	red: 18-Jan-	-2018 Ana	lyzed: 20-J	an-2018 11:	38		
Total Phosphorus	ND	0.0160	mg-P/L							U
LCS (BGA0389-BS1)			Prepa	ared: 18-Jan-	-2018 Ana	lyzed: 20-J	an-2018 11:	24		
Total Phosphorus	0.294	0.0160	mg-P/L	0.300		98.0	90-110			
LCS (BGA0389-BS2)			Prepa	ared: 18-Jan-	-2018 Ana	lyzed: 20-J	an-2018 11:	38		
Total Phosphorus	0.298	0.0160	mg-P/L	0.300		99.3	90-110			

Analytical Resources, Inc.



Herrera Environmental Consultants
Project: Hydro International
2200 6th Avenue, Suite 1100
Project Number: 13-05605-000

 2200 6th Avenue, Suite 1100
 Project Number: 13-05605-000
 Reported:

 Seattle WA, 98121
 Project Manager: Dylan Ahearn
 24-Jan-2018 16:10

### **Certified Analyses included in this Report**

Analyte	Certifications
---------	----------------

EPA 200.8 in Water	
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-63	NELAP,WADOE,WA-DW,DoD-ELAP
Copper-65	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-66	NELAP,WADOE,WA-DW,DoD-ELAP
Zinc-67	NELAP,WADOE,WA-DW,DoD-ELAP

EPA 6010C in Water

Calcium WADOE,NELAP,DoD-ELAP Magnesium WADOE,NELAP,DoD-ELAP

SM 4500-P E-99 in Water

Orthophosphorus WADOE,NELAP
Total Phosphorus WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn24-Jan-2018 16:10

### **Notes and Definitions**

U	This analyte is not detected above the applicable reporting or detection limit.
0	ins analyte is not detected above the applicable reporting of detection inint:

J Estimated concentration value detected below the reporting limit.

D The reported value is from a dilution

\* Flagged value is not within established control limits.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

[2C] Indicates this result was quantified on the second column on a dual column analysis.

# **January 27, 2018**

# Data\_18A0436

ARI ID	Client ID	Proj ID	Matrix	Sampled	Rec	Prep	Analyzed	Method	CAS	Compound	Value	Q	Units
BGA0663-BLK1	Blank	13-05605-000	Water			01/29/2018	01/29/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0040	U	mg-P/L
BGA0663-BS1	LCS	13-05605-000	Water			01/29/2018	01/29/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.150		mg-P/L
18A0436-01	WUFF-IN	13-05605-000	Surface Water	01/27/2018	01/29/2018	01/29/2018	01/29/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0050	Н	mg-P/L
18A0436-02	WUFF-OUT	13-05605-000	Surface Water	01/27/2018	01/29/2018	01/29/2018	01/29/2018	SM 4500-P E-99	1426-54-42	Orthophosphorus	0.0060	Н	mg-P/L
BGA0688-BLK1	Blank	13-05605-000	Water			01/30/2018	02/01/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0160	U	mg-P/L
BGA0688-BLK2	Blank	13-05605-000	Water			01/30/2018	02/01/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0160	U	mg-P/L
BGA0688-BS1	LCS	13-05605-000	Water			01/30/2018	02/01/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.146		mg-P/L
BGA0688-BS2	LCS	13-05605-000	Water			01/30/2018	02/01/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.148		mg-P/L
18A0436-01	WUFF-IN	13-05605-000	Surface Water	01/27/2018	01/29/2018	01/30/2018	02/01/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0320		mg-P/L
18A0436-02	WUFF-OUT	13-05605-000	Surface Water	01/27/2018	01/29/2018	01/30/2018	02/01/2018	SM 4500-P E-99	7723-14-0	Total Phosphorus	0.0480		mg-P/L



16 February 2018

Dylan Ahearn Herrera Environmental Consultants 2200 6th Avenue, Suite 1100 Seattle, WA 98121

**RE:** Hydro International

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

Associated SDG ID(s)

18A0436

# Amanda Volgardsen l=Tukwila, o=Analytical Resources, Inc., ou=Client

Digitally signed by Amanda Volgardsen DN: c=US, st=Washington, Volgardsen, email=amandav@arilabs.com Date: 2018.02.16 12:32:34 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.





### 18A0436 2200 Sixth Avenue | Suite 1100 Seattle, Washington | 98121 p 206 441 9080 | f 206 441 9108

# Chain of Custody Record

Project Name:	Projec	t Number:	Client:					Analyses Requested										
Hydro International Up-flo Filter 13-05605-000			Herrera Environmental															
Report To:			Copy To:				2540D	trati		Particle size Distribution - ASTM 3977	Total phosphorus - EPA 365.3	Orthophosphorus - EPA 365.3	-Hardness-as-CaCO3•SM 2340B	- EPA 200.8	200.8-	Zino, dissolved - EPA-200,8		
Dylan Ahearn								Suspended Sediment Concentration – SMD3977	spi									
Sampled By: B. Bland			Delivery Method	i:			Solids-SM		ilos-babu								8-6	
Laboratory:		Requested Co	ompletion Date:	Total No.	of Contain	ners:	Sp	din	edsi	istri	snus	orus	acc	red.	EPA	Ŧ	7.50	
Analytical Resources Inc.							pue	d Se	e-Sr	ze D	spho	spho	as-C	1966	100	had	EP	
Lab Use:				Sample Type (see	Preser- vative?	Matrix (see	al Suspended	pende MD3977	ri-volatii	article si	tal phos	thopho	irdness	Copper, dissolved	Copper-total - EPA 200.8-	o <del>, disso</del>	Zine, total - EPA 200.8	Lab ID No.
Sample ID		Date	Time	codes)	(Y/N)	codes)	Total	Sus - S	SAN	P.	ř	ō	Ħ	69	Co	Zin	Zin	Lab
WUFF-IN		1.27.18	9:30	С	N	SW	х	X	*	X	Х	Х	X	*	×	*	X	
WUFF-OUT		127.19		С	N	SW	х	Х	×	Х	Х	Х	x	X	X,	X	X	
										11								
											-							
														-				
							-										-	
														4				
																u .		
Comments/Special Instructions:		*																
Send 1 liter to ETS, Inc 975 Trans	sport Way, Suite 2, Pet	aluma, CA 1	for PSD, TSS, a	nd TVSS.	PSD to	be run f	or >5	00, 50	0-125	, 125-	62.5,	62.5-4	1, <4.					
Relinquished by (Name/CO/ BNUMA Blund	Signature (	hi	Date/Time	15 15 Be	ceived By	(Name/CC	1-1	Sna		Signatur	e T	A	_			Date/1	179 1 15	8
Relinquished by (Name/CO/	Signature	1	Date/Time	Re	ceived By	(Name/CC	)		-	Signatur	e					Date/1	ime	
									+ 11									

Sample Type: G=Grab C=Composite

Matrix Codes: A=Air GW=Groundwater SE=Sediment SO=Soil SW=Surface Water W=Water (blanks) M=Material O=Other (specify)





Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn16-Feb-2018 12:31

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
WUFF-IN	18A0436-01	Water	27-Jan-2018 09:36	29-Jan-2018 15:15
WUFF-OUT	18A0436-02	Water	27-Jan-2018 06:02	29-Jan-2018 15:15

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn16-Feb-2018 12:31

### **Case Narrative**

### Sample receipt

Samples as listed on the preceding page were received January 29, 2018 under ARI workorder 18A0436. For details regarding sample receipt, please refer to the Cooler Receipt Form. The samples were split by sample receiving prior to analysis. The TSS and PSD analysis was subcontracted to ETS Labs. The SSC analysis was subcontracted to MTC.

### Wet Chemistry (O-Phos, T-Phos)

The O-Phos was received outside of the fourty-eight hour recommended holding time, and has been flagged with an "H" qualifier.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

The LCS percent recoveries were within control limits.

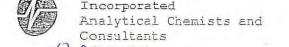
Analytical Chemists and Co	nsultants	Cooler Red	ceipt Form
ARI Client: Herre ra		HINGS	Int
COC No(s):		Project Name:	Miternational
Assigned ARI Job No: 181643	6 NA	Delivered by: Fed-Ex UPS Co	urier Hand Delivered Other:
Preliminary Examination Phase:	0	Tracking No:	
Were intact, properly signed and dated custo	dy seals attached to	the outside of to cooler?	YES NO
Were custody papers included with the coole			
Were custody papers properly filled out (ink, s Temperature of Cooler(s) (°C) (recommended Time:	signed, etc.) d 2.0-6.0 °C for chen		YES NO
If cooler temperature is out of compliance fill	out form 00070F		Temp Gun ID# 002 CG C
Cooler Accepted by:	set	_Date: 1/29/18 Tim	ne: 1515
Comple	te custody forms a	and attach all shipping documents	
Log-In Phase:			
Was a temperature blank included in the cools	er?		VEC (G)
What kind of packing material was used?	Bubble Wrap	Wet Ice Gel Packs Baggies Foam	YES NO
Was sufficient ice used (if appropriate)?		•••••••	· · ·
Were all bottles sealed in Individual plastic bag	gs?	***************************************	. 23
Did all bottles arrive in good condition (unbrok	en)?	No. Color Color A. Color Angel Color Color	YES NO
Were all bottle labels complete and legible?	The sales of the sales of the sales	······································	YES NO
Did the number of containers listed on COC m	atch with the number		YES NO
Did all bottle labels and tags agree with custod	STOLL MITTI THE HOLLING	or containers received?	NO NO
Did all bottle labels and tags agree with custod	y pepers/		YES NO
Were all bottles used correct for the requested	analyses?		YES NO
Do any of the analyses (bottles) require preser	vation? (attach pres	servation sheet, excluding VOCs)	NA (ES) NO
Were all VOC vials free of air bubbles?			(NA) YES NO
Was sufficient amount of sample sent in each t	oottle?		YES NO
Date VOC Trip Blank was made at ARI		***************************************	NA CLES
Was Sample Split by ARI: NA YES	Date/Time: 12	A 119 Equipment Churc	a Splittvsplit by: SEF
Samples Logged by:	Dete:	1/20/18 Time: 1	705
** Notify	/ Project Manager (	of discrepancies or concerns **	
Sample ID on Bottle Sampl	e ID on COC	To Compare In the International	
	2 ID 011 000	Sample ID on Bottle	Sample ID on COC
	34		
	W_		
Additional Notes, Discrepancies, & Resolutio	1922		
Additional Hotse, blacispanoles, a Tresoluin	ins:		
By: Date:			
Small Air Bubbles Pestubbles Lago	SE Air Butides   S	Small → "sm" (<2 mm)	
= ?   6   Lanc		Peabubbles > "pb" (2 to < 4 mm)	
	Automotive to the second	arge → "lg" (4 to < 6 mm)	*
	0 0	-41名6 2 12 (410~0回回)	

0016F 3/2/10

Cooler Receipt Form

Headspace → "hs" (>6 mm)

Revision 014



# Compliance Form

Cooler#: Tem	perature(°C):	land i
Sample ID	perature(°C): Bottle Count	Bottle Type
		Bottle Type
Cumpled		
Samply received		
(Mous la		
Cooler#:Temp	perature(°C):   Bottle Count	
Sample ID	Bottle Count	Bottle Type
·		
Cooler#: Temp	100\c	La contraction de la contracti
Sample ID	erature(°C):	m . w . z
Sample 19	Bottle Count	Bottile Type
470		
Cooler#: Temp	erature(°C):	
Sample ID	Bottle Count	Bottle Type
		20410 1990
	V -	
<u></u>	(4)	
		,
	1	
(FG		
Completed by:	Date	:: 1129 18 Time: 15 15
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

00070F Cooler Temperature Compliance Form

Version 000<sup>-</sup> 3/3/09



# ETS

# Environmental Technical Services

-Soil, Water & Air Testing & Monitoring

-Analytical Labs

-Technical Support

975 Transport Way, Suite 2 Petaluma, CA 94954 (707) 778-9605/FAX 778-9612

e-mail: entech@pacbell.net

Serving people and the environment so that both benefit.

OMPANY:	Analytical Resources, Inc., 4611 S. 134th Place, Suite	e 100, Tukwila, W	/A 98168		ANALYST(S)	SUPERVISOR
ATTN:	Amanda Volgardsen	DATE	DATE	DATE	S. Santos	D. Jacobson
JOB:	Hydro International Up-Flo Filter	COLLECTED	RECEIVED	COMPLETED	L. Quijano	LAB DIRECTOR
SITE:	Oregon-Washington	1/27/2018	1/31/2018	2/12/2018		G.S. Conrad,PhD

PAI	RTICLE SIZI	E DISTRIBUTI	ON (PSD), TS:	S & TVSS AN	IALYSIS & R	EPORT - 5 P	ART	
SAMPLE ID	SOURCE of WATER	SUSPENDED SOLIDS	SUSPENDED SOLIDS	SUSPENDED SOLIDS	SUSPENDED SOLIDS	SUSPENDED SOLIDS		SUSPENDED SEDIMENT CONG TSS mg/l
		<b>2.7</b> 9.8%	<b>2.2</b> 8.0%	<b>2.0</b> 7.3%	Total SSC by	13.3 48.4% y Summation →	7.3 26.5% 27.5	24.0
		<b>2.0</b> 10.9%	<b>2.2</b> 12.0%	<b>1.5</b> 8.2%	Total SSC by	<b>7.2</b> 39.1% y Summation →	5.5 29.9% 18.4	19.5
		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! Total SSC by	#DIV/0! y Summation →	#DIV/0! 0.0	
		#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! Total SSC by	#DIV/0! y Summation →	#DIV/0! 0.0	
SAMPLE	SOURCE of WATER	Water pH -log[H+]	ECw [Spec Cond] µS/cm	COLOR, TRUE PtCo Units	COLOR APPARENT PtCo Units	TOTAL IRON Fe (diss.) mg/l	SUSPENDED	VOLATILE O SOLIDS (TVSS) mg/l
	SAMPLE  ID  HI-55HEC/RW 18A04  HI-56HEC/RW 18A04	SAMPLE SOURCE of ID WATER  HI-55HEC/RW WUFF-IN 18A0436-01  HI-56HEC/RW WUFF-OUT 18A0436-03  SAMPLE SOURCE of	SAMPLE         SOURCE of SOLIDS mg/l @ ≥500 μ           ID         WATER mg/l @ ≥500 μ           HI-55HEC/RW         WUFF-IN 18A0436-01         2.7 9.8%           HI-56HEC/RW         WUFF-OUT 10.9%         2.0 10.9%           #DIV/0!         #DIV/0!           SAMPLE         SOURCE of         Water pH of	SAMPLE         SOURCE of SOLIDS         SUSPENDED SOLIDS SOLIDS           ID         WATER         mg/l @ ≥500 μ mg/l @ 125 μ           HI-55HEC/RW         WUFF-IN 18A0436-01         2.7         2.2           9.8%         8.0%           HI-56HEC/RW         WUFF-OUT 2.0         2.2           18A0436-03         10.9%         12.0%           #DIV/0!         #DIV/0!           #DIV/0!         #DIV/0!           SAMPLE         SOURCE of Spec Cond]	SAMPLE         SOURCE of SOLIDS         SUSPENDED SUSPENDED SOLIDS         SUSPENDED SOLIDS         SOLIDS SOLIDS         SOLIDS mg/l @ ≥500 μ mg/l @ 125 μ mg/l @ 63 μ           HI-55HEC/RW         WUFF-IN 18A0436-01         2.7         2.2         2.0           HI-56HEC/RW         WUFF-OUT 2.0         2.2         1.5           18A0436-03         10.9%         12.0%         8.2%           #DIV/0!         #DIV/0!         #DIV/0!         #DIV/0!           SAMPLE         SOURCE of         Water pH         ECw COLOR, [Spec Cond]         TRUE	SAMPLE         SOURCE of SOLIDS         SUSPENDED SUSPENDED SUSPENDED SOLIDS         SOLIDS SOLIDS         Mad/I @ 32 μ         Mad/I	SAMPLE	SOLIDS   Mg/I @ 2500 μ mg/I @ 125 μ mg/I @ 63 μ mg/I @ 32 μ mg/I @ 4 μ mg/I @ 1 μ mg/I @ 1 μ mg/I @ 1 μ mg/I @ 4 μ mg/I @ 1 μ mg/I @ 1 μ mg/I @ 4 μ mg/I @ 4 μ mg/I @ 1 μ mg/I @ 1 μ mg/I @ 4 μ mg/I @ 4 μ mg/I @ 1 μ mg/I @ 1 μ mg/I @ 4 μ mg/I @ 4 μ mg/I @ 1 μ mg/I @ 4 μ mg/I @ 4 μ mg/I @ 1 μ mg/I @ 4 μ mg/I @ 4 μ mg/I @ 1 μ mg/I @ 1 μ mg/I @ 4 μ mg/I @ 4 μ mg/I @ 1

#### COMMENTS

The matrix has a very low concentration of TSS particles amounting to just under 25 ppm in the input sample; and the output sample is about four-fifths of that amount. The overall average reduction in TSS is just under 26% of the total TSS. The range is fairly wide in this case at 18.8%-33.1%% (TSS by analytical method vs TSS by summation). The reductions in each fraction vary somewhat as follows: 25.9%, 0.0%, 25.0%, 45.9%, and 24.7%. Notice that for the input sample the mode is at the 4-63  $\mu$  fraction at nearly half of the total TSS (48.4%), and the finest fraction is a little over one-quarter (26.5%); all other fractions are much lower in proportion being in the 7%-10% range. Thus, the size distribution is skewed low, but is not right at the bottom of the range. Based on the overall distribution, it seems most probable that the majority of the 4-63  $\mu$  fraction would be below 20  $\mu$  in size. The RPDs are very good to excellent as follows:  $\pm 6.8\%$ ; and  $\pm 2.9\%$ .

\\\ NOTES: Tests were done according to methodology as per Association of Testing Materials (ASTM): Suspended Sediment Concentration – Modified ASTM D3977 (Practice for Determining Suspended-Sediment Concentration in Water Samples). Standard Methods is followed for the other tests: Color - 2120 C; Spec Cond. (ECw) - 2510 B; Iron - 3500-Fe B; pH - 4500-H+ B: TRPH - 5520 C.

Page 7 of 15 18A0436 ARISample FINAL 16 Feb 2018 1231

# Materials Testing & Consulting, Inc.



Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

Project:	Hydro International (18A0436)	Date Received:	January 31, 2018
Project #:	16T001-035	Sampled By:	Others
Client :	Analytical Resources, Inc.	Date Reported:	February 16, 2018
Source:	Multiple	Tested By:	B. Goble
MTC Sample#:	Multiple		

# CASE NARRATIVE

2. 3. 4.	Two samples were submitted for sediment concentration by ASTM D3977, Method C. The coarse material was screened over a No. 230 sieve. The suspended solids are reported in mg/L. The data is provided in a summary table. There were no other noted anomalies in this project.
٥.	There were no other noted unomaries in this project.

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Reviewed by:

Corporate ~ 777 Chrysler Drive • Burlington, WA 98233 • Phone (360) 755-1990 • Fax (360) 755-1980

# Page 9 of 15 18A0436 ARISample FINAL 16 Feb 2018 1231

# Materials Testing & Consulting, Inc.

Geotechnical Engineering • Special Inspection • Materials Testing • Environmental Consulting

**Project:** Hydro International (18A0436) Project #: 16T001-035

> Sampled by: Others Tested by: B. Goble

Client: Analytical Resources, Inc.

Date Received: January 31, 2018 Date Tested: February 6, 2018

#### Suspended Sediment Concentration ASTM D3977 Method C

Client Sample ID	MTC Sample ID	Sampling Date	Coarse Fraction SSC (>63µm) (mg/L)	FineFraction SSC (<63µm) (mg/L)	Total Suspended Sediment Concentration (mg/L)
WUFF-IN	S18-0135	1/27/2018	15.0	12.0	27.0
WUFF-OUT	S18-0136	1/27/2018	9.3	12.5	21.8

All results apply only to actual locations and materials tested. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

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Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn16-Feb-2018 12:31

## WUFF-IN 18A0436-01 (Water)

**Wet Chemistry** 

Method: SM 4500-P E-99 Sampled: 01/27/2018 09:36

Instrument: UV1800-2 Analyzed: 29-Jan-2018 18:32

Sample Preparation: Preparation Method: SM 5310 A-00, 0.45um filtration

Preparation Batch: BGA0663 Sample Size: 50 mL Prepared: 29-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0050 mg-P/L H

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid

Preparation Batch: BGA0688 Sample Size: 25 mL Prepared: 30-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0160 0.0320 mg-P/L

Analytical Resources, Inc.



Herrera Environmental Consultants Project: Hydro International

2200 6th Avenue, Suite 1100Project Number: 13-05605-000Reported:Seattle WA, 98121Project Manager: Dylan Ahearn16-Feb-2018 12:31

## WUFF-OUT 18A0436-02 (Water)

**Wet Chemistry** 

Method: SM 4500-P E-99 Sampled: 01/27/2018 06:02

Instrument: UV1800-2 Analyzed: 29-Jan-2018 18:32

Sample Preparation: Preparation Method: SM 5310 A-00, 0.45um filtration

Preparation Batch: BGA0663 Sample Size: 50 mL Prepared: 29-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Orthophosphorus 1426-54-42 1 0.0040 0.0060 mg-P/L H

Sample Preparation: Preparation Method: SM 4500-P B-4 Strong Acid

Preparation Batch: BGA0688 Sample Size: 25 mL Prepared: 30-Jan-2018 Final Volume: 50 mL

Analyte CAS Number Dilution Result Units Notes

Total Phosphorus 7723-14-0 1 0.0160 0.0480 mg-P/L

Analytical Resources, Inc.

Herrera Environmental Consultants

Project: Hydro International

2200 6th Avenue, Suite 1100Project Number:13-05605-000Reported:Seattle WA, 98121Project Manager:Dylan Ahearn16-Feb-2018 12:31

#### **Wet Chemistry - Quality Control**

#### Batch BGA0663 - SM 5310 A-00, 0.45um filtration

Instrument: UV1800-2 Analyst: CDE

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0663-BLK1)			Prepa	red: 29-Jan	-2018 Ana	lyzed: 29-J	an-2018 18:	27		
Orthophosphorus	ND	0.0040	mg-P/L							U
LCS (BGA0663-BS1)			Prepa	ared: 29-Jan-	-2018 Ana	lyzed: 29-J	an-2018 18:	27		
Orthophosphorus	0.150	0.0040	mg-P/L	0.150		100	90-110			

Analytical Resources, Inc.

Herrera Environmental Consultants 2200 6th Avenue, Suite 1100

Seattle WA, 98121

Project Number: 13-05605-000
Project Manager: Dylan Ahearn

**Reported:** 16-Feb-2018 12:31

#### **Wet Chemistry - Quality Control**

#### Batch BGA0688 - SM 4500-P B-4 Strong Acid

Instrument: UV1800-2 Analyst: SK

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BGA0688-BLK1)			Prepa	red: 30-Jan-	-2018 Ana	lyzed: 01-F	eb-2018 15	:38		
Total Phosphorus	ND	0.0160	mg-P/L							U
Blank (BGA0688-BLK2)			Prepa	red: 30-Jan-	-2018 Ana	lyzed: 01-F	eb-2018 16	:04		
Total Phosphorus	ND	0.0160	mg-P/L							U
LCS (BGA0688-BS1)			Prepa	red: 30-Jan-	-2018 Ana	lyzed: 01-F	eb-2018 15	:39		
Total Phosphorus	0.146	0.0160	mg-P/L	0.150		97.3	90-110			
LCS (BGA0688-BS2)			Prepa	red: 30-Jan-	-2018 Ana	lyzed: 01-F	eb-2018 16	:05		
Total Phosphorus	0.148	0.0160	mg-P/L	0.150		98.7	90-110			

Analytical Resources, Inc.



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#### **Certified Analyses included in this Report**

Analyte Certifications

SM 4500-P E-99 in Water

Orthophosphorus WADOE,NELAP
Total Phosphorus WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	UST-033	05/11/2018
CALAP	California Department of Public Health CAELAP	2748	02/28/2018
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/07/2019
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006	05/11/2018
WADOE	WA Dept of Ecology	C558	06/30/2018
WA-DW	Ecology - Drinking Water	C558	06/30/2018

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#### **Notes and Definitions**

U This analyte is not detected above the applicable reporting or detection limit.

H Hold time violation - Hold time was exceeded.

DET Analyte DETECTED

ND Analyte NOT DETECTED at or above the reporting limit

NR Not Reported

dry Sample results reported on a dry weight basis

RPD Relative Percent Difference

[2C] Indicates this result was quantified on the second column on a dual column analysis.