Parametrix

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June 6, 2012
PMX No. 555-3747-003 (06/04)

Mr. Richard Morck, P.E.
Landmarc Technologies, Inc.
14816 439th Place SE
North Bend, WA 98045-9248

Re: May 2012 Surface Water monitoring Results for Newcastle Landfill

Dear Mr. Morck:

This letter and data summary table reports the results of the May 21, 2012 routine surface water monitoring of Coal Creek and China Creek near Newcastle Landfill. Rainfall at Sea-Tac Airport on the previous day was 0.17 inch. Steady rain continued on the day of sampling with an accumulation of 0.61 inch.

Current *Water Quality Standards for Surface Waters of the State of Washington* (Chapter 173-201A WAC) provide standards based on use designations for waters of the state. As feeder streams to lakes, Coal and China creeks are protected for the designated uses of: salmon and trout spawning, core rearing, and migration; extraordinary primary contact recreation; domestic, industrial and agricultural water supply; stock watering; wildlife habitat; harvesting; commerce and navigation; boating; and aesthetic values.

Field measurements and observations indicated that water quality conditions in Coal and China creeks were similar to previous monitoring events dating back to 1989. The likely sources of elevated fecal coliform are wildlife and pet waste carried by rainfall runoff. Concentrations were highest from SW-3N and SW-15 (including field duplicate SW-16) that receive runoff from the residential areas in these watersheds (Table 1, Figure 1). Turbidity in Coal Creek at SW-4 was elevated by the contribution of the SW-3N tributary stream that was an opaque brownish orange color. SW-3N flows into Coal Creek from the north and so the elevated turbidity cannot be related to the former landfill site. Dissolved oxygen less than 9.5 mg/L in the China Creek headwaters at SW-8 and SW-9, and the Coal Creek headwaters at SW-1, was attributed to naturally-occurring processes of organic matter (e.g. leaf litter) decomposition and respiration.

Sampling and analysis methods were consistent with past monitoring events and Post-Closure Plan (Parametrix 1998) requirements. Conventional water quality parameters (i.e., temperature, dissolved oxygen, pH, and conductivity) were measured at all sampling stations with field meters. Laboratory samples were analyzed for fecal coliform, hardness, and sulfide (see attached laboratory data package). A quality assurance review of laboratory results (i.e. method blanks, spike samples, duplicate analyses, etc.) indicated acceptable accuracy and precision of analyses; no data qualifiers were necessary. A field duplicate sample was also collected at SW-15 (duplicate labeled SW-16) for fecal coliform, sulfide and hardness analyses.

COAL CREEK

Results from the May monitoring event indicated that the landfill had no substantive impacts on Coal Creek water quality (north of the landfill). There was no surface runoff observed entering Coal Creek from the direction of the landfill via ephemeral channels or overland flow. All monitoring results for Coal Creek met Washington State water quality standards for pH and temperature (Table 1). Fecal coliform exceeded the 50 colonies/100 ml limit at all Coal Creek monitoring sites except background site SW-1, and was highest at SW-3N. Turbidity was elevated in Coal Creek at SW-4 (19 NTU) due to the highly turbid water entering from SW-3N (280 NTU). The SW-3N drainage does not include any water originating from the former landfill site, but may have had high turbidity and fecal coliform from extensive suburban residential development in its watershed. Dissolved oxygen was at or above the 9.5 mg/L minimum standard at all Coal Creek sites except the background site SW-1. Unlike many past monitoring events, low levels of sulfide were detected at all sites, with the highest concentration found in the SW-1 background sample. Hardness concentrations were within the range of past monitoring results.

CHINA CREEK

Similar to Coal Creek, surface water samples from the China Creek drainage (south of the landfill) were within Washington State water quality standards for temperature and pH (Table 1). Turbidity also met the standard at all China Creek monitoring sites. Fecal coliform exceeded the 50/100 ml standard at the SW-8 background site and increased to 2,100 /100 ml at SW-15. These results indicate that fecal coliform sources likely included both wildlife and pet wastes from residential runoff. Dissolved oxygen concentrations were at or above the 9.5 mg/L minimum standard at all sites except SW-9 (7.3 mg/L) and the background site SW-8 (8.3 mg/L). The lower dissolved oxygen levels may be attributed to the natural oxygen-consuming processes of respiration and plant decomposition, particularly in the wetland pond upstream from SW-9. Flow at monitoring station SW-13 was insufficient for monitoring, and station SW-12 was dry.

The range of hardness concentrations in the China Creek watershed was similar to previous monitoring events, and low levels of sulfide were detected in all samples, including the background sample SW-8.

CONCLUSIONS

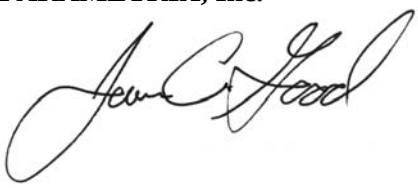
Coal Creek samples met all evaluated Washington State numerical surface water quality standards at every site with the following exceptions: dissolved oxygen at the background station SW-8 was below the minimum criterion, turbidity at SW-4 increased more than 5 NTU over background due to the contribution from the northern tributary SW-3N, and fecal coliform exceeded the numerical criterion particularly at SW-3N. The results showed no evidence of water quality degradation that could be attributed to the closed landfill site. China Creek samples met all Washington State numerical surface water quality standards during this monitoring event, with only two exceptions. The low dissolved oxygen concentration at background station SW-8 and station SW-9 were attributed to naturally-occurring processes of organic matter (e.g. leaf litter) decomposition and respiration, particularly in the stagnant upstream wetland area. Fecal coliform counts exceeded the water quality standard at all sites including the SW-8 background site, and was particularly high at SW-15 downstream from residential developments.

In summary, the excursions from surface water quality standards at Coal Creek and China Creek were attributed to sources other than the landfill. No monitoring observations or laboratory results indicated adverse water quality conditions attributed to the landfill.

Please call me if you have any questions about these results or the monitoring program in general.

Sincerely,

PARAMETRIX, Inc.



Jim Good, Senior Water Quality Specialist

Attachment

cc: Bill Lasby, Public Health Seattle & King County
Jing Liu, Cleanup Program NWRO, Washington State Department of Ecology
Lisa Gilbert, Parametrix Project Manager

Table 1. Newcastle Landfill Surface Water Monitoring Results, May 21, 2012

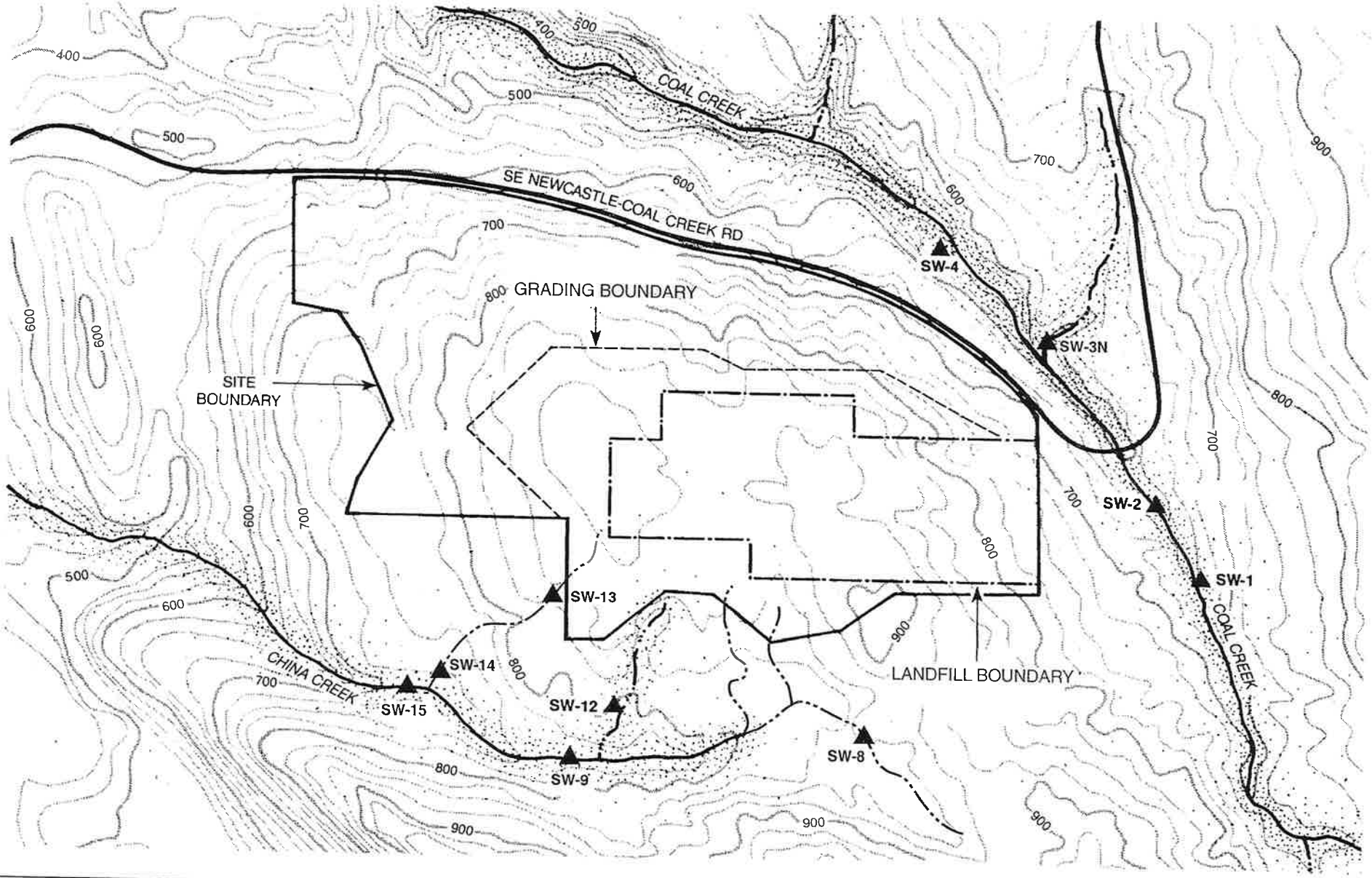
Station	Temperature (°C)	Dissolved Oxygen (mg/L)	pH	Conductivity (umhos/cm)	Turbidity (NTU)	Hardness (mg/L)	Fecal Coliform (#/100 ml)	Sulfide (mg/L)
Coal Creek								
SW-1 (background)	10.6	**9.2**	7.3	102	4.6	42.0	36	0.26
SW-2	10.4	11.3	7.5	105	3.6	39.9	**750**	0.18
SW-3N	11.3	11.1	7.4	182	**280**	61.0	**1,400**	0.20
SW-4	10.8	10.9	7.4	188	**19**	67.8	**100**	0.20
China Creek								
SW-8 (background)	11.3	**8.3**	7.2	103	6.4	42.0	**220**	0.20
SW-9	11.6	**7.3**	7.2	159	0.25	70	**423**	0.20
SW-12	--	--	--	--	--	--	--	--
SW-13	--	--	--	--	--	--	--	--
SW-14	13.7	9.5	7.4	89	3.6	39.3	**350**	0.20
SW-15	12.9	9.8	7.4	92	3.9	39.1	**2,100**	0.22
SW-16 (SW-15 duplicate)	--	--	--	--	0.66	39.5	**2,500**	0.20
Water Quality Standards (WAC 173-201A)	16°C	9.5 mg/L minimum	6.5 - 8.5	N/A	5 NTU over background	N/A	50/100 ml	N/A

Notes:

- - = no sample or measurement

N/A = not applicable, no State standard

boldface = result is excursion fro



Parametrix Newcastle Landfill/555-3747-001(01) 12/02 (K)

SCALE IN FEET

0 500 1,000

N

▲SW-1 Surface Water Monitoring Station

Figure 1
Surface Water Monitoring Locations at Newcastle Landfill

AQUATIC RESEARCH INCORPORATED

LABORATORY & CONSULTING SERVICES

3927 AURORA AVENUE NORTH, SEATTLE, WA 98103

PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	**PAR011-32**		**PAGE 1**
REPORT DATE:	**05/31/12**		
DATE SAMPLED:	**05/21/12**	**DATE RECEIVED:**	**05/21/12**

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM PARAMETRIX

CASE NARRATIVE

Nine water samples were received by the laboratory in good condition. Analysis was performed according to the chain of custody received with the samples. No difficulties were encountered in the preparation or analysis of these samples. Sample data follows while QA/QC data is contained on subsequent pages.

SAMPLE DATA

SAMPLE ID	FECAL COLIFORM (#/100mL)	HARDNESS (mgCaCO3/L)	SULFIDE (mg/L)
SW-1	36	42.0	0.26
SW-2	750	39.9	0.18
SW-3	1400	61.0	0.20
SW-4	100	67.8	0.20
SW-8	220	42.0	0.20
SW-9	423	70.0	0.20
SW-14	850	39.3	0.20
SW-15	2100	39.1	0.22
SW-16	2500	39.5	0.20

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CASE FILE NUMBER:	**PAR011-32**		**PAGE 2**
REPORT DATE:	**5/31/2012**		
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FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM PARAMETRIX

QA/QC DATA

QC PARAMETER	FECAL COLIFORM (#/100mL)	HARDNESS (mgCaCO3/L)	SULFIDE (mg/L)
METHOD	SM20 9222D	EPA 130.2	EPA 376.1
DATE ANALYZED	05/21/12	05/30/12	05/29/12
DETECTION LIMIT	5	2.00	0.05
DUPLICATE			
SAMPLE ID	SW-16	SW-16	SW-16
ORIGINAL	2500	39.5	0.20
DUPLICATE	2800	39.3	0.24
RPD	11.32%	0.50%	18.18%
SPIKE SAMPLE			
SAMPLE ID		SW-16	
ORIGINAL		39.5	
SPIKED SAMPLE		58.6	
SPIKE ADDED		20.0	
% RECOVERY	NA	95.77%	NA
QC CHECK			
FOUND		39.1	
TRUE		40.0	
% RECOVERY	NA	97.72%	NA
BLANK	<5	<2.00	<0.05

RPD = RELATIVE PERCENT DIFFERENCE.
NA = NOT APPLICABLE OR NOT AVAILABLE.
NC = NOT CALCULABLE DUE TO ONE OR MORE VALUES BEING BELOW THE DETECTION LIMIT.
OR = RECOVERY NOT CALCULABLE DUE TO SPIKE SAMPLE OUT OF RANGE OR SPIKE TO LOW RELATIVE TO SAMPLE CONCENTRATION.

Submitted By:

Damien Gadomski

Damien Gadomski
Project Manager

Aquatic Research Incorporated

3927 Aurora Ave. N / Seattle, WA 98103 / (206) 632-2715 Newcastle

CHAIN-OF-CUSTODY RECORD

SHEET 1 OF 1

CLIENT: Parametrix

SAMPLING DATE: 5/22/2012

SAMPLERS: Jim Good

PROJECT ID:

CASE FILE NO.:

DATA RECORDED BY: J.G.

SAMPLE INFORMATION

SAMPLE ID	DATE/TIME COLLECTED	PARAMETERS: Sulfide	Hardness	Metal solution	BOTT #	NOTES
SW-1	0955	1	1	1	3	
SW-2	0940	1	1	1	3	
SW-3	0855	1	1	1	3	
SW-4	0845	1	1	1	3	
SW-8	1345	1	1	1	3	
SW-9	1310	1	1	1	3	
SW-14	1045	1	1	1	3	
SW-15	1035	1	1	1	3	
SW-16	1055	1	1	1	3	

	Relinquished By	Date/Time	Received By	Date/Time
Printed Name	Jim Good	5/22/2012 2:35	S. Hikes	5/22/12
Signature				1435
Affiliation	Parametrix		ARI	

	Relinquished By	Date/Time	Received By	Date/Time
Printed Name				
Signature				
Affiliation				

Miscellaneous Notes (Hazardous Materials, Quick turn-around time, etc.): Zn acetate in sulfide samples